

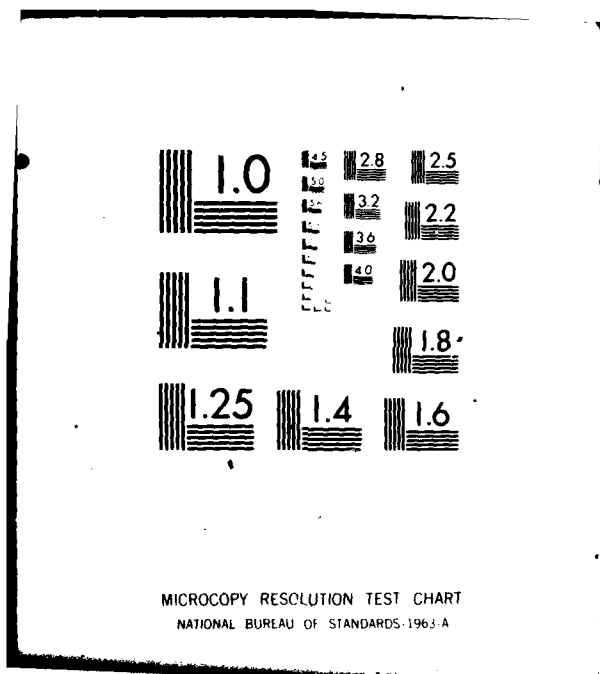
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DEPARTMENT OF THE ARMY

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ENVIRONMENTAL IMPACT ASSESSMENT


OVERALL TRAINING MISSION, FORT CHAFFEE

FORT CHAFFEE, ARKANSAS

April 1975

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20. ↓ pollution load of the local waters. Track and wheeled vehicles of training units contribute to soil erosion as does construction activities. Fort Chaffee has an impact on the region's economy and population. There are many recreational activities in and near the facility. The method in which lands have resulted in its general improvement.

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ENVIRONMENTAL IMPACT ASSESSMENT
OVERALL TRAINING MISSION, FORT CHAFFEE, ARKANSAS

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ENVIRONMENTAL IMPACT ASSESSMENT

OVERALL TRAINING MISSION, FORT CHAFFEE, ARKANSAS

Section 1

Project Description

1.1 General description of Fort Chaffee and its training mission.

To properly evaluate the environmental impacts of the current overall training program at Fort Chaffee, an understanding of the reservation's origin, and a history of its use is essential. This is necessary in order to evaluate significant accumulative impacts associated with current activities which result or originate from past periods of intensive human use. In addition to the following brief paragraphs, past and present use will be found threaded throughout the narrative of this assessment.

a. Specific location. The Fort Chaffee Military Reservation lies in western Arkansas approximately 7 miles east of Fort Smith, the major city in this part of Arkansas. The reservation is approximately 19 miles east to west in its longest dimension and varies in width from 4 to 9 miles north to south. The northern boundary roughly parallels State Highway 22, an east to west highway connecting Fort Smith, Russellville, Little Rock, and other towns and cities in Arkansas. A portion of the northern boundary crosses the Arkansas River. The southern boundary varies from 1/4 mile to 3 miles north of State Highway 10. State Highway 96 runs north to south through the approximate center of the reservation.

b. History of acquisition. The land area comprising Fort Chaffee prior to its acquisition by the Government consisted of numerous tracts of land, many of which were individual farm units. These tracts varied in size from 40 to 80 acres up to several thousand acres in size. Most of the farm units consisted of small fields of cropland (cotton and corn), pasture, farm wood lots, and small irregular shaped areas of abandoned cropland. The residents generally descended from the original settlers, but a trend of renter-occupied farms had begun to develop. Fertility of the land had declined due to poor crop and grazing practices and many of the original families moved to Fort Smith or other communities and rented out their homesteads.

After acquiring the land from the individual owners, the Government removed most of the houses, fences, and other improvements. In some cases the dams of stock tanks were cut in order to drain the pools to eliminate mosquito breeding.

Original land acquisition amounted to 76,075 acres; however, due to disposals, corrected surveys, and audits, current land under the jurisdiction and use of Fort Chaffee amounts to 71,979.35 acres. A summary of land under control by the Government by class of control by county is as follows:

<u>Name of County</u>	<u>Land Fee Owned</u>	<u>Public Domain Withdrawal</u>	<u>Land Held By Lease or Agreement</u>	<u>Ease-ments</u>	<u>Total</u>
Sebastian	61,412.81	160	883.89	3.85	62,460.55
Crawford	507.50	0	0	0	507.50
Franklin	<u>8,840</u>	<u>160</u>	<u>0</u>	<u>0</u>	<u>9,000</u>
Total	70,760.31	320	883.89	3.85	71,968.05

The original land cost was approximately \$2,222,673.29, or an average of \$29.55 per acre. The average cost per acre does not include public domain or in-lease lands.

c. History of military activation-deactivation. Fort Chaffee was established as Camp Chaffee under directives issued by the Department of the Army in 1941. The original construction directive provided for facilities for housing a division with supporting troops for a total of 30,000 men. Prior to actual construction, supplementary directives were received augmenting the overall construction to include all facilities for two armored divisions with supporting facilities, one division to be housed in theater of operations type buildings in the west area. Initial planning for construction of Camp Chaffee was started in May 1941, and the facilities in the east area were completed for beneficial occupancy in June 1942. Planning for the west area troop housing began in June 1942, and construction was substantially completed in April 1943. The first occupying cadre arrived in February 1942; subsequently, three armored divisions were housed during World War II. From January 1947 to January 1948 and from April 1950 to August 1950, Camp Chaffee was designated as a camp on inactive standby status. The post was reactivated in August 1950 as Headquarters, 5th Armored Division, with the primary mission being a replacement training center for field artillery. The 5th Armored Division had a tripartite mission:

first, to train nonprior service enlisted men, and give refresher training in basic military subjects and fundamentals of infantry combat; second, to qualify basic combat trained personnel as cannoneers and fire direction specialists; and third, to train selected male enlisted personnel as common specialists. In February 1956, the post was redesignated as the United States Army Training Center, Field Artillery. Department of the Army (DA) General Order Number 11, dated 21 March 1956, redesignated Camp Chaffee, Arkansas, as Fort Chaffee, Arkansas, and designated it as a permanent DA installation. In accordance with DA General Order Number 1, dated 15 January 1959, Fort Chaffee was declared inactive as of 30 June 1959, and remained on a caretaker status until 1 October 1961, at which time it reopened with an assigned mission of training the 100th Division. In 1962 the 100th Division was inactivated, and the new mission assigned was support of the 3rd Corps Artillery and the XIX Corps (Reserve). Fort Chaffee was inactivated 3 June 1965.

d. Current mission. In June 1965, the U.S. Army Caretaker Detachment was formed as a staff element of the XIX U.S. Army Corps and assumed its assigned mission on 1 July 1965, the date of the inactivation of Fort Chaffee. On 12 April 1967, just prior to the inactivation of the XIX Corps, this detachment was attached and later assigned to Headquarters, Fort Sill, Oklahoma. Under General Order Number 711, dated 8 October 1974; U.S. Army Caretaker Detachment, Fort Chaffee, Arkansas, was designated U.S. Army Garrison, Fort Chaffee (Semi-Active) (WOVBAA), Fort Chaffee, Arkansas, and became effective 30 November 1974.

The present mission of the installation is to provide facilities and support training of National Guard (NG) and Army Reserve (USAR) units. Marine and Navy reservists, Air National Guard (ANG) units, and Reserve Officer Training Corps (ROTC) units are also supported in their training activities. Support is rendered to an estimated 60,000 troops throughout the calendar year. Saturated training begins in May and continues through September, and various units are supported on weekends throughout the year. A detailed mission statement of the U.S. Army Garrison, Fort Chaffee, Arkansas, is as follows:

(1) To maintain, manage, and provide security and protection of personnel, real property (to include contents), grounds, roadways, and utility systems within the Fort Chaffee area of responsibility.

(2) To provide, within available resources and limitations, all services necessary to operate and maintain the physical plant and facilities of the installation and satellited facilities, including ranges, buildings and ground maintenance, land management, repair of roads and railroads, pest control, operation and maintenance of heating, sanitation, power, fire prevention, and related engineering, communications, administration, equipment maintenance, and supply services.

(3) Plans, coordinates, and furnishes administrative, logistical, and training support, as directed by higher headquarters, for the operation of Fort Chaffee in support of NG and USAR units and activities utilizing the installation for annual training (AT). Open and close station facilities as necessary.

(4) To plan, coordinate, and conduct an Environmental and Energy Conservation program in accordance with AR 200-1 and other appropriate guidance from higher headquarters.

(5) To provide range support to ROTC, USAR, Marine Reserve (USMCR), and NG units utilizing installation range facilities during weekend training periods.

(6) To provide transportation movement services to members of all branches of military service within the assigned area of responsibility (16 counties in Arkansas and 10 counties in Oklahoma) including shipment of household goods and effects, arranging dependent and concurrent travel, assisting eligible personnel in military travel; and movement of installation in-bound and out-bound freight.

(7) To provide training aid support to all USAR, NG, and ROTC units located in Arkansas; provide training aid support for USAR and NG units conducting annual unit training at Fort Chaffee; and to stock and maintain a supply of DA GTAs for world-wide distribution.

(8) To support eligible dependents and retired personnel residing in the Fort Chaffee area by furnishing Identification Card service, information and assistance on Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), and other administrative services.

(9) Through the use of a Strategic Command (STRATCOM) Detachment, provide communication services to all activities stationed at Fort Chaffee as well as the installation, operation and maintenance of the range system and other fixed-wire systems; installation, maintenance, and removal of telephones for each major reserve component encampment; and maintenance support of communication electronic equipment as required.

(10) To operate and maintain an equipment pool in support of the Reserve Component training program.

(11) To operate and maintain a holding area for Property Disposal activities.

(12) To operate limited Post Exchange facilities, club activities, and a Troop Issue Commissary.

In order to carry out the assigned mission statements, the operating budget of Fort Chaffee approximates \$12 to \$13 million a year.

1.2 Description of current military activities.

Due to the nature of the primary utilization of Fort Chaffee as a reserve component training center, the description of current military activities is discussed under two paragraph headings, on-post activities and off-post activities.

a. On-post activities. On-post activities are considered in four basic categories: garrison, site support, training, and post exchange activities.

(1) Post population. The post population is considered to consist of two distinct elements, military and civilian. The population of Fort Chaffee for 1972 is shown in table 1-1. In terms of man-years of activity, a measure of total use, table 1-2 lists military and civilian output for the fiscal years 1970 through 1973.

(2) Garrison activities. The U.S. Army Garrison, Fort Chaffee (Semi-Active) (WOVBAA), Fort Chaffee, Arkansas, currently (1973) has an authorized strength of 3 officers, 1 warrant officer, 4 enlisted men, and 130 civilians to fulfill the mission as previously stated. Table 1-3 depicts the organizational chart for the garrison. The following discussions center on specific actions over which the garrison has responsibility.

(a) Physical plant and facility maintenance. Utilities and buildings are maintained for immediate mobilization in accordance with existing mobilization plans.

(b) Grounds maintenance. Garrison personnel maintain 3,400 acres of improved grounds by mowing and landscaping with the aid of substantial mechanical equipment. Control of weeds, soil erosion, and other problems that arise from time to time are maintained on the remaining 67,231 acres. Weed control herbicides include Amitrole, Simazine, Dalapon, 2-4-D, and Monuron.

(c) Roads and railroad maintenance. Patchwork, grading, brush control, and other maintenance are performed by garrison personnel on 80 miles of surfaced roads, 86 miles of graveled roads, and 125 miles of dirt roads. Weeds are controlled along about 8 miles of railroad. Maintenance crews are aided in their work by a substantial amount of mechanical equipment.

(d) Land management. Fort Chaffee maintains firebreaks totaling 120 miles. Examples of these are shown in figure 1-1 and figure 1-2. The average width of these breaks is 72 feet.

Table 1-1

POST POPULATION - FORT CHAFFEE, ARKANSAS
Calendar Year 1973

All figures pertain to man-years except where indicated by an asterisk (*) which pertains to actual number of men.

Post Population	Military	Civilian	Total
Garrison Manpower	16	107	123
Provided annually in support of training	73	55	128
Troops trained*			
Annual training	25,781*	0	38,157*
Weekend training	12,376*	0	
TENANTS			
AOMS #15	0	13	13
Defense Investigative Service	3	0	3
U.S. Army Training Aids Center	0	7	7
Army-Air Force Exchange Service	0	39	39
Civil Air Patrol	0	2	2
Arkansas Game and Fish Commission**	<u>0</u>	<u>2</u>	<u>2</u>
Totals	38,249	225	38,474
**Has intermittent workers			

Table 1-2

MAN-YEARS OF USE - FISCAL YEAR 1970 through FISCAL YEAR 1973

Man-Years	FY 1970	FY 1971	FY 1972	FY 1973
Military:				
Garrison	19	103	59	69
AT	1,163	1,082	943	1,031
IDT		14	34	18
Others				
Subtotal	1,182	1,199	1,036	1,118
Civilian				
Caretaker	124	124	127	163
Others	25	54	77	89
Subtotal	149	178	204	252
Grand Total	1,331	1,377	1,240	1,370

Table 1-3

U.S. ARMY GARRISON, FOR CHAFFEE
FORT CHAFFEE, ARKANSAS 72901

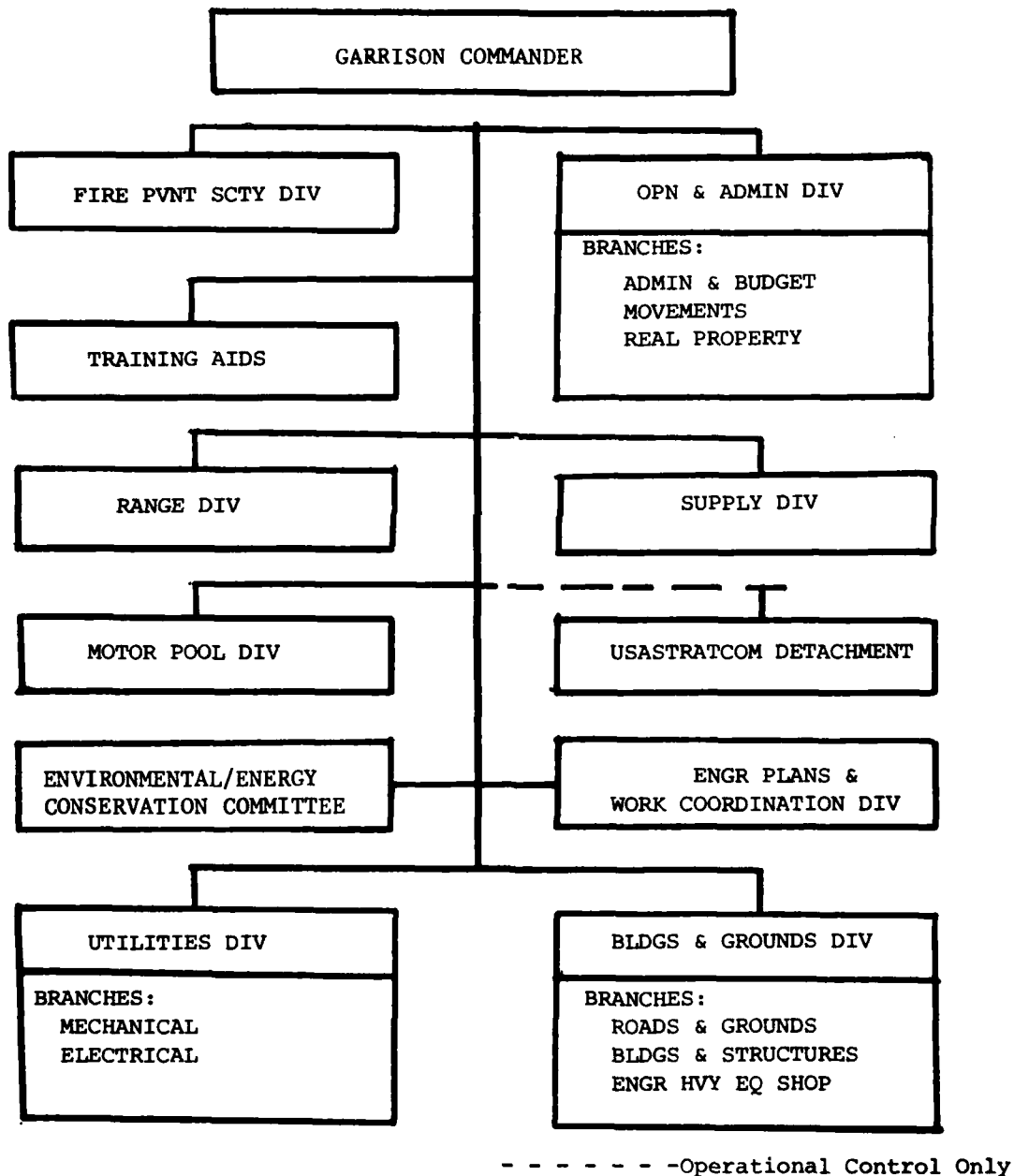




FIGURE 1-1

FIREBREAK PARALLELING HIGHWAY 22

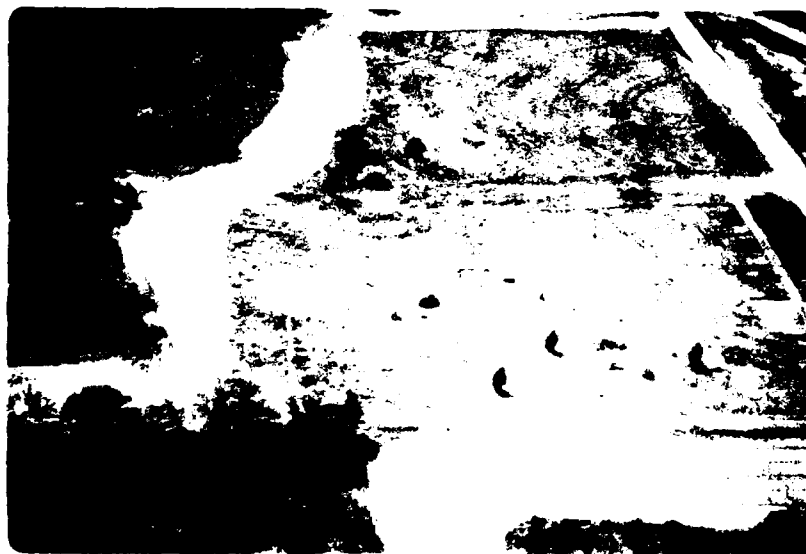


FIGURE 1-2

FIREBREAK AND CEMETERY

They are maintained with tractors and tandem discs. The firebreaks are maintained twice each year, once in June and once in September.

There are no post cemeteries on Fort Chaffee. All 23 cemeteries are private cemeteries for which the installation is responsible. Public access is unrestricted; however, anyone wishing to visit a cemetery or hold a funeral must inform post headquarters to insure that all gates to the cemetery are unlocked. Memorial Day is observed at cemeteries now being used on designated Sundays during the month of May. The first mowing and cleaning of these cemeteries is scheduled to coincide with the respective Decoration Days. They are mowed a second time in late June and a third time in September. No maintenance is performed on cemeteries where no outside interest is evident, since most of them are individual or family plots. All cemeteries are fenced with permanent type fences and steel gates.

(e) Pest control. Disease carrying insects and rodents are controlled by insecticides and rodenticides administered by garrison personnel using truck-mounted sprayers, portable and hand sprayers, a fogger, and other fumigation equipment. Control chemicals used are Malathion and Dichlorvos strips for flies, Chlordane for termites, Phostoxin for grain insects, Diazinon for roaches, Naled mixed with Ortho emulsifier for mosquitoes, Lindane for fleas, and Warfarin for mice.

(f) Fire protection and prevention. Fort Chaffee maintains its own fire protection service. At present, only one fire station is in operation. The station has a complement of 20 people including the fire chief. Personnel have a dual capacity as firemen and security guards. Fire prevention and protection equipment consists of three 750-gallon pumper trucks, two brush fire trucks, two water tankers, and one fire chief pickup truck. Additional fire fighting assistance is available from the city of Fort Smith, Arkansas, if it is needed.

Further, if fires occur as a result of training activities, additional men and equipment are available to support the permanent force. Units undergoing range firing training where there is a fire potential usually have designated fire suppression units (platoon or company size). The units are designated on unit orders and/or in unit standard operating procedures. Most firing range regulations or standard operating procedures state that, if there is a fire down range that could endanger military personnel or equipment, all range firing will cease until said fire is extinguished.

Many of the buildings on-post have automatic sprinkler systems and automatic fire alarm devices. These buildings include most of the hospital facilities, recreation facilities, administrative buildings, and some warehouses.

Fire hydrants are distributed throughout the cantonment area in conjunction with the water distribution system.

(3) Site support activities. Since the authorized strength of the garrison is such that it cannot physically render all site support services to the USAR and NG two-week training sessions in addition to its principal garrison activities of operation and maintenance, arrangements have been made to transfer site support responsibilities to Reserve garrison commanders. The Reserve garrison organization basically conforms to a normal US Army garrison with post support functions added. Memorandums of understanding exist between the commander of Fort Chaffee and the Reserve garrison commander which outline the garrison's command functions and relationships.

(4) Training activities. Training activities constitute the major use of lands and facilities at Fort Chaffee. Two general types of training take place during the year. The two-week annual training sessions by Reserve and National Guard units are accommodated principally in the summer months; however, the period of this type of training extends from April through October. Approximately 35,000 troops were involved during 1973, an increase over the 25,000 and 23,000 troops for the previous two years. Inactive duty training is the second type of training activity accomplished. Inactive duty training principally occurs during the weekends from October to April. Approximately 3,500 troops were involved in 1973, relatively the same number as in previous years.

The two-week annual training units consist of two basic groups. The larger number of Reserve and National Guard troops conduct unit size training programs utilizing those areas necessary to fulfill their training needs. Examples of these units would include the 39th Infantry Brigade of the Arkansas National Guard, the 71st Infantry Brigade, Texas National Guard, and the 5154 US Army Reserve.

The smaller number of troops, although involving a greater diversity in types of units, play a dual role. They satisfy their own training requirements and also provide site support to the major units. Examples of these units include the 172d Heavy Equipment Maintenance Company, Arkansas National Guard, and the 1138th M.P. Company, Missouri National Guard.

Post utilization during inactive duty training on weekends consists primarily of small weapon familiarization and qualification on the post ranges. Small airborne units such as the 12th Special Forces also utilize the drop zones on the post during this period of the year.

In addition to the Army Reserve components, Marine and Navy reservists, the Air National Guard, Regular Air Force, and ROTC units utilize Fort Chaffee for training purposes.

In terms of use, the National Guard utilizes Fort Chaffee to a greater extent than the Army Reserve troops. During 1971 and 1972 the ratio of National Guard troops to Reserve troops was more than three to one.

(5) Post Exchange activities. The Post Exchange serves two basic populations, the military retirement community in the western Arkansas-eastern Oklahoma area, and the Reserve and National Guard troops while they are on active duty on weekends and summer periods. Approximately half of the total yearly sales of the Post Exchange occur during the 8 1/2 months of slack activity on the post, and the other half occurs during the intensive troop usage during the summer months.

The Post Exchange currently employs 19 people full time. This permanent group is supplemented by 97 additional people in the summer time. There are also a number of concessions leased out which have additional people working on the post.

Facilities operated by the Post Exchange include a cafeteria, snack bar, main exchange, service station, three beer arcades, an outdoor store, a dairy stand at the post theater, two barber shops, two laundries, two mobile units, and various drink vending machines.

Not over 15 percent of the total purchasing by the Post Exchange is done locally. The bulk of the purchasing is done through contract buying by the Army-Air Force Exchange Service. Post Exchange sales from 1968 to 1973 are summarized in table 1-4.

Table 1-4

POST EXCHANGE SALES BY BRANCH
1968 to 1973
FORT CHAFFEE, ARKANSAS

Branch	1968	1969	1970	1971	1972	1973
Retail*	\$743,032	\$728,206	\$743,612	\$892,008	\$971,572	\$1,372,530
Food*	63,531	45,547	69,163	145,418	106,861	92,975
Service	26,369	24,083	23,116	19,091	20,505	36,041
TOTAL	\$832,932	\$797,836	\$835,891	\$1,046,457	\$1,098,938	\$1,501,546
Troop Strength						
	24,844	20,544	24,809	22,711	21,320	29,618

*Beer arcade sales transferred to Retail from Food in 1973.

Summary is for the period May to September reflecting operational areas and sales generated in support of annual active duty training at Fort Chaffee.

b. Off-post activities.

(1) Troop movements. Travel by Reserve component troops coming to and from Fort Chaffee, Arkansas, reached into 16 states and 83 communities or metropolitan areas during 1973. Most of this movement occurred during the weekends, as troops who have completed their two-week training depart on Saturdays, and troops arriving for their training period report on Sundays. As an example of troop dispersement, a list of states and the number of communities involved can be found in table 1-5.

(2) Retired military community. The retired military community broadly consists of the western Arkansas-eastern Oklahoma area; however, most of the retirees who utilize post services live in the immediate Fort Smith area. Estimates of the local retired community for 1972 were 700 retirees and 2100 retiree dependents. Activities in which the retired community and their dependents utilize post facilities and lands

Table 1-5
RESERVE COMPONENT TROOPS, POINT OF ORIGIN
BY
STATE AND NUMBER OF COMMUNITIES
1973

<u>States</u>	<u>No. of Communities or Metropolitan Areas</u>
Arkansas	24
<u>Adjoining States</u>	
Texas	20
Oklahoma	5
Missouri	4
Louisiana	5
<u>Other States</u>	
Michigan	4
Indiana	2
Illinois	12
Wisconsin	2
Iowa	2
Nebraska	2
Kansas	11
Kentucky	1
New Mexico	1
California	2
Washington	1

are varied but significant. For example, the retired community and their dependents represent nearly one-half of the total sales at the Post Exchange. Principal support of the golf course and clubhouse comes from the retired community. Other facilities used when they are open during intensive training periods include the swimming pool, theater, and the Officer and NCO clubs. The retired community also has access to the hunting and fishing opportunities afforded by the reservation's resources.

1.3 Description of current nonmilitary activities.

The following discussion describes current nonmilitary activities at Fort Chaffee that are not in themselves specifically associated with the overall training mission, but are very much influenced by the existence and extent of the training mission.

a. Agricultural leasing program. Fort Chaffee was opened to three small cropland leases in 1947. These leases remained unchanged until 1969. The first large scale outleasing of Fort Chaffee was accomplished in 1959. A total of 54,473.5 acres was put up for lease under nine tracts. Post utilization was the determining factor in deciding boundary lines of different tracts. For example, the artillery impact area, being of one use and purpose, was put under one tract. Three tracts totaling 643.5 acres were old cropland leases; five other tracts were also designated. The annual rental from these first leases was \$12,411.89. The only service required was to build a boundary fence around the leased area. In 1964-65 these nine tracts were up for re-leasing. All tracts stayed essentially the same. With the addition of two new tracts totaling 957 acres the entire post was under lease except for the cantonment area and the small arms range. Additional services were provided under the new leases. Besides fence construction, services such as pond construction, new food plots, and new gates were made part of the lease requirements.

The current leases were renegotiated in 1969 and 1970 with the exception of one tract that was renewed in January 1973.

b. Current management trends. Due to the differences in soils, topography, the availability of water, and other factors, the leased areas show many variations from one part of the reservation to another. For example, only two tracts are suitable for cropland or irrigation. This land is irrigated by pumping from sloughs, the Arkansas River, or shallow wells. These two leases produce mainly truck garden crops such as tomatoes, peppers, sweet potatoes, cantaloupes, greens, and watermelon. One tract also produces alfalfa and soybeans. All other tracts leased by Fort Chaffee are for grazing or haying purposes only.

Grazing areas bordering the perimeter boundary are all fenced with a five strand barbed wire fence with steel posts every 12 feet. All other fences are temporary fences owned by the lessees. These fences are mainly three strand barbed wire with wooden posts. The grasses utilized and managed under the grazing leases are essentially the same in all tracts; however, the actual amounts of different species of grasses vary from one area to another. The important grasses are little bluestem, splitbeard bluestem, Indiangrass, switchgrass, eastern gamagrass, paspalums, panicum, longspike, tridens, velvetgrass, dropseed, broomsedge, and purple top. There are many other lesser quality grasses on Fort Chaffee which are usually grazed only after the above-mentioned species are gone or grazed to the ground.

Under proper management, Fort Chaffee could have a year-long grazing season. Water would be no problem, because ponds are located on an average of only one mile apart. At present the condition of the range is too poor to consider year round grazing. According to the Soil Conservation Service (SCS), approximately 53 percent of the rangeland is in poor condition, 40 percent is in fair condition, and 7 percent is in good condition. This is due to the constant overgrazing in the past by a former lessee. The lease held by this individual was canceled in 1972 for noncompliance. These tracts will be resurveyed annually by SCS and other interested Federal agencies. When they have made sufficient recovery, a new lease for these areas will be considered.

The current carrying capacity is set at a maximum of one animal unit per 40 acres for all grazing leases. This arbitrary figure is too high for some leases and too low for others. In future leases a carrying capacity in acres/animal units will be determined for each lease prior to outleasing. The determination will be written into the lease as the maximum stocking rate. The SCS will make annual range surveys and report the results to Fort Chaffee. Fort Chaffee will notify the lessee in writing of any changes in the stocking rates for the coming year, based on SCS recommendations.

c. Fish and wildlife management program.

(1) History. The management of fish and wildlife resources, including migratory birds, is essentially the responsibility of the Arkansas Game and Fish Commission. To more effectively manage these resources the "Cooperative Plan for Conservation and Development of Fish and Wildlife Resources on Fort Chaffee Military Reservation" was agreed to 19 July 1963 and signed by the Commanding Officer, Fort Chaffee, Arkansas; Director, Arkansas Game and Fish Commission; and Regional Director, Bureau of Sport Fisheries and Wildlife. A supplemental agreement to this plan was signed 30 September 1965 by

the Commanding Officer, Fort Chaffee, Arkansas; Acting Regional Director, Bureau of Sport Fisheries and Wildlife; and Director, Arkansas Game and Fish Commission. The plan laid the broad framework of the formal management program to be carried out on Fort Chaffee lands. During late November and early December 1967, a wildlife enhancement biologist from the Bureau of Sport Fisheries and Wildlife made a field trip to Fort Chaffee and subsequently prepared a report outlining 17 recommended actions for improving the fish and wildlife potential of the installation. The plan, its supplement, and the report were used as a basis for preparation of a preliminary management plan by the post Wildlife Conservation and Enforcement Officer during calendar years 1967 and 1968. This preliminary management plan set forth criteria for the maintenance and improvement of fish and wildlife resources in accordance with Army Regulation 420-74, dated June 1966, and the previously mentioned "Cooperative Plan for Conservation and Development of Fish and Wildlife Resources on Fort Chaffee Military Reservation." The State of Arkansas was then issued a license 24 September 1970 for the purpose of fish and wildlife management on about 67,000 acres of land.

(2) Current management trends. An enforcement officer and a biologist from the Arkansas Game and Fish Commission staff have been assigned to the post to implement recommended management plans. Management activities are related primarily to the improvement of habitat for:

Game:

Whitetail Deer
Migratory Red Squirrel
Mourning Dove
Bobwhite Quail
Nonresident Ducks
Raccoon
Armadillo
Beaver

Red Squirrel
Cottontail Rabbit
Woodcock
Resident Ducks
Geese
Opossum
Mink

Fish:

Largemouth Bass
Redear Sunfish
Longear Sunfish
Flathead Catfish
Blue Catfish
Carp

Warmouth
Bluegill
Sand Bass
Channel Catfish
Crappie
Gar

Nongame Birds:

Crow	Thrush
Bluejay	Blackbird
Song Sparrow	Cardinal
Starling	Sparrow Hawk
Red-winged Blackbird	Meadow Lark
Mockingbird	Bluebird
Golden Eagle	

(a) Wildlife management. Management practices include controlled burning on about 20,000 acres each year. By burning this amount annually, nearly all of the approximately 67,000 acres under management can be burned on a 3 year rotation. This has been determined to be most beneficial because the brush is usually so thick and entangled as to be virtually impenetrable by the third year, and perennial plants usually need the opening by the third year to germinate and grow to produce seeds and cover for smaller animals.

Cultivated food plots (figure 1-3) were initiated in the autumn of 1971. The practice has been expanded until now about 240 acres are being disced, seeded, and fertilized annually. Most of the several small acreage food plots are fenced so that cattle are excluded and deer and other wildlife are permitted to enter. Those plots seeded for winter usage are planted to clover, wheat, and rye. Those plots seeded in the spring for summer usage are planted primarily to a couple of varieties of millet. Miscellaneous areas of soil disturbed by training exercises such as tank maneuvers are reseeded as soon as advisable to do so. Because of excess dampness during the spring of 1973, about 1,000 acres of the post were seeded by aircraft. Other management activities assist the survival of some 200 species of birds which have been noted during Audubon Society bird censuses. Major predators receiving benefits from management activities are the coyote and bobcat.

(b) Fisheries management. The Soil Conservation Service (SCS) through the lease cooperator program built 94 stock tanks or ponds between 1969 and 1972. These impoundments have an average volume of 2500 cubic yards and a surface area of about 3/4 acre. The impoundments have been fairly evenly scattered throughout the post. The primary reason for scattering is to permit or encourage even grazing over all the lands leased for that purpose. In the past livestock have had a tendency to overgraze pastures near the few existing impoundments.



FIGURE 1-3
WILDLIFE FOODPLOT

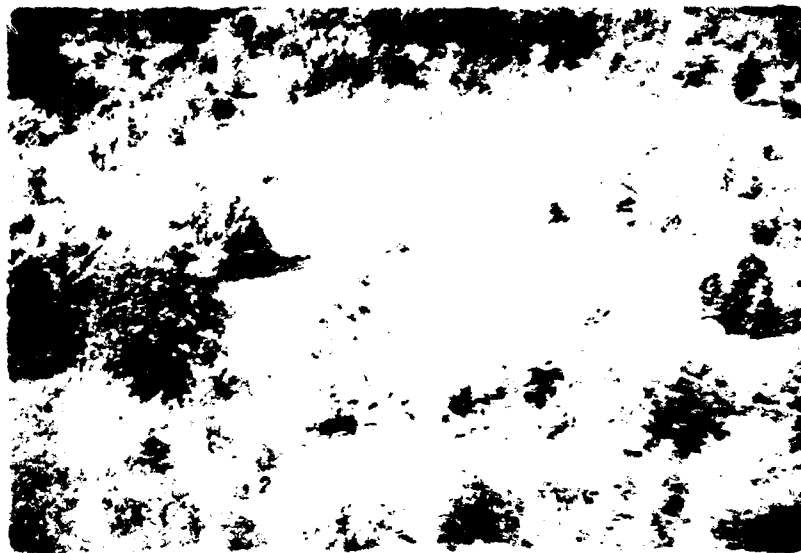


FIGURE 1-4
FISH STOCKED POND

1971: One hundred fourteen deer were harvested in a three day, bucks only, hunt. It was estimated that 2,000 to 2,500 hunters utilized the area.

1970: Seventy deer were harvested in a six day, bucks only, permit hunt. Five hundred permits were issued.

d. Recreational use.

Recreational facilities available at Fort Chaffee are listed as follows: 1 gymnasium, 3 theaters, 19 ballfields (7 are lighted), 8 tennis courts (4 are lighted), 1 swimming pool (50 meters), 100 camper and trailer spaces, and a golf course. Facilities also considered available for recreational pursuits include officer and NCO clubs, the main PX store, beer gardens, and a steak house. These are open during the intensive annual training.

The Fort Chaffee golf course consists of 117 acres in the cantonment area. Ten greens are maintained (nine on the course and one practice putting green). The average size of a green is 3,600 square feet. Summer turf is Tifgreen and winter turf is pencross bentgrass. The tees and fairways are both common bermudagrass.

(1) Civic use. Considerable recreational and civic use is made of Fort Chaffee by nearby citizens primarily from the Fort Smith area. Table 1-6 lists groups and numbers of individuals utilizing Fort Chaffee in some manner for each month of 1972.

(2) Outgrants. Several outgrants in addition to the agricultural leases and the fish and wildlife license discussed above are in existence. These outgrants are in the form of licenses, easements, or permits. The SCS has a 315 acre permit for a reservoir (Darby Lake). The US Army Corps of Engineers has three permits for channelization and bank stabilization on the Arkansas River. The Corps also had a permit for 15 acres of land for removal of borrow material in the construction of Lock and Dam #13. Permits for utilization of buildings for classroom or administrative purposes have been granted the Arkansas National Guard, the U.S. Air Force, and the Civil Air Patrol. Six highway right-of-way and access licenses or easements have been issued. At least 13 existing electric, telephone, water, and gas utility right-of-way licenses and easements have changed little over the last 5 years.

1.4 Description of current land use.

a. General. Land use at Fort Chaffee has been classified into five general categories:

Table 1-6

CIVIC GROUPS UTILIZING FORT CHAFFEE, ARKANSAS - 1972

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Riding Clubs				80	250				200	140		
Boy Scouts	60	150	150	50								60
Girl Scouts				60	300				50	400		
4-H Club Members							120					
Rifle Clubs & Safety Clinic	7	7	7						15	445		8
Cycle Club				10								
Civilian Fishing Derby				180		35			25			
Campers at Wells Lake						30	66	42				
Westark Wildlife Assoc.	18	14	6	8	7				19	21		
Audubon Society	12	8	18	26	30	8	10	9	32	27		
Arkansas Game and Fish Commission Tours	32	35			22				27	18		
ROTC (Social Activity)											200	
Men's Club											225	
Fishermen	1,500	1,500	2,000	3,000	3,000	2,500	2,500	2,500	3,500	3,500	300	300
Hunters	8,500	3,000							2,500	4,200	8,000	4,500

Cantonment	4,338 acres
Magazine area	750 acres
Ranges and small arms impact area	12,229 acres
Ranges and artillery impact area	19,023 acres
Bivouac and training areas	<u>35,628 acres</u>
	71,968 acres

b. Facility summary. An "Analysis of Existing Facilities," dated 1 August 1970, adequately describes the facilities at Fort Chaffee. This report details the land utilization, buildings, roads and streets, utilities, and specific use areas, and need not be repeated here. In summary, at Fort Chaffee there are 1,265 buildings, of which 35 are permanent and 1,230 are temporary. There is only one unit of family housing on the post. The barracks can house 15,847 enlisted men at 72 square feet per man, or 28,393 in emergency occupation. There are 4,561,715 square yards of surfaced area, 23 cemeteries, 8 miles of railroad, over 63 miles of sanitary sewer, 23 miles of gas distribution, over 83 miles of electrical distribution, 80 miles of paved roads, 86 miles of gravel roads, 125 miles of dirt roads, and 7 large timber bridges. Acquisition cost of the present buildings, structures, and facilities totals \$32,543,127.

c. Training areas. For training purposes, Fort Chaffee has been divided into approximately 67 areas. The following narrative describes the relative size of each area, its normal use, and special features of interest.

Battalion training areas vary in size from 363 acres to 1,286 acres each. They are normally used by annual training units the first week of summer camp for close-in training near the cantonment such as basic map reading, basic leadership, weapons instruction, various class type subjects in preparation for field exercises, and a compass course used both day and night for cross country navigation with maps and compass. The area immediately east of the cantonment is utilized for bivouac sites while troops are in the field during small unit and large unit cross country tactical exercises, small arms and crew served weapons range firing, artillery and tank firing, and engineer road and field fortifications training. A Bailey Bridge site lies on the north side of the Arkansas River bypass. Reserve component engineers have constructed permanent concrete abutments attaching the bridge ends. This saves valuable time in bridge training since the summer camp time is limited to two weeks. Infantry units use the area and bridge during maneuvers. This area is the only area on the reservation suitable for river crossing operations and training. Corps of Engineer personnel at Lock and Dam 13 are notified of training activities.

In addition to the above, located around the perimeter of the Small Arms Impact Area, (12,229 acres), are 22 small arms and crew served weapons ranges. They are rifle, pistol, rocket, machine gun, demolition and mines, infiltration course, rifle and hand course, rifle and hand grenade and a close combat course. These ranges are utilized on weekends for familiarization training and annual qualification training. They are used extensively during summer camp.

In addition to being a field training area, there are surveyed gun positions that are used for Honest John rocket firing. This area can also accommodate firing of the 8-inch Howitzer and 175mm gun. These weapons fire exclusively into the Artillery Impact Area (19,023 acres).

The post has 153 surveyed artillery and mortar firing positions. The caliber and type weapons that can be fired are 81mm and 4.2-inch mortars, 105mm, 155mm, 8-inch Howitzers, and 175mm guns. The vast majority of these positions are located within bivouac areas, thus enabling the units to conduct field training concurrently with firing exercises. The positions vary from flat cleared areas to rolling wooded to mountainous. This enables artillery units to move, shoot, and communicate over different types of terrain. Worthy of mention is that the local artillery units do most of their small arms firing at Fort Chaffee during the weekends in order to spend as much time as possible on the artillery range during summer camp.

The Small Arms Impact Area has no need for a safety zone due to the range of the weapons being fired. All ammunition is fired into a central area and will not pass beyond a known point. However, the Artillery Impact Area requires a safety zone because of the long range and lethality of the projectiles. Regulations require that the impact area be marked in such a manner as to warn personnel to keep out due to dud hazards. This is normally accomplished with warning signs along the boundary of the impact area. Fort Chaffee's impact area is adequate for all artillery firing; however, its proximity to the northeast and south reservation boundaries leaves a marginal safety (buffer) zone (approximately 7,260 acres). In the event of human error or material malfunction a projectile could pass the limits of the impact area and, hopefully, explode in the safety zone.

There is a 106mm recoilless rifle moving target range in a training area in the southeast sector of the reservation and a 50 caliber stationary target range nearby. These are located adjacent to the artillery impact area due to the range of their projectiles. The 106mm firing site has become a point of controversy with some adjacent residential landowners.

Restricted airspace over Fort Chaffee is in two locations. The small arms ranges and impact area, totalling 12,500 acres, are restricted up to an altitude of 13,000 feet, and the artillery impact area and gun positions containing 38,130 acres are restricted up to 30,000 feet altitude.

There is one primary airfield, one landing field, and two emergency landing fields on the installation. All are open field or grass strips. The primary airfield is utilized by the local Civil Air Patrol for training as well as inbound and outbound single engine military aircraft. All landing fields are used for reserve component training of aerial observers in artillery adjustment, convoy control, and communications relays. The emergency fields are ideally located due to the mountainous area that aerial observers must fly over during their training. These airfields are used extensively during the three months period of annual training by the various artillery groups. An F105 Fighter Range (gunnery range) of approximately 80 acres has been developed in range 555. A helicopter Gunship Range of approximately 782 acres has been developed in the Lone Star Valley impact area.

There are three airborne drop zones located on Fort Chaffee. One which can accommodate at least a battalion size troop and heavy equipment drop is 5,000 feet long and 3,000 feet wide. Another drop zone is located in the old cantonment area and is 5,000 feet long by 4,000 feet wide. Although not conducive to equipment drops because of its location, it is suitable for company size troop drops. The third and smallest is 4,000 feet by 3,000 feet. It is used for smaller unit troop drops. All drop zones are ideally suited for tactical training once the personnel are on the ground. The smallest is ideal for small groups when training to establish a bridgehead for river crossings.

The magazine area is located adjacent to and south of the troop housing area and contains approximately 94 acres. About 74 acres are enclosed by an 8-foot chain link fence where there are 23 steel igloos with concrete floors, ranging in size from 200 to 800 square feet. All igloos are mounded with an earth blanket and sodded. The remaining acres are used for open storage of ammunition and are enclosed with a five strand barbed-wire fence. Approximately 656 acres surrounding the magazine are quantity distance zones.

d. Existing utilities.

(1) Water supply. The water supply for Fort Chaffee is purchased from the city of Fort Smith, Arkansas, and is delivered through an 18-inch cast iron main. This main is connected to the city supply on Massard Road and extends to the point near building number 4462

where it connects to the installation's distribution system. The city of Fort Smith receives its water supply from two impounded lakes located near Mountainburg, Arkansas, in the Boston Range of the Ozark Mountains approximately 25 miles north of Fort Smith. Lake Fort Smith was constructed in 1935. Due to the increasing demand for water supply, another lake with approximately the same capacity as Lake Fort Smith was constructed upstream. Construction of the new lake, named Sheppard Springs Lake, was completed in 1956. The capacity of the lakes is estimated to be sufficient to meet a maximum daily average demand of 36,000,000 gallons per day for the four high consumption months of the year. The quality of the water is considered excellent, with a low PH value, somewhat mineralized, but soft. The watershed covers a large wooded area allowing for very little sedimentation into the lake.

Water storage facilities at Fort Chaffee were designed for a maximum daily demand of 3,500,000 gallons per day. Water storage consists of one 2,500,000 gallon steel ground storage tank located near the hospital area. In addition, one 1,000,000 gallon, elevated, concrete storage tank is located in the west area. The water distribution system was designed to serve a population of 25,000 men in each of the two troop housing areas.

(2) Sewage collection and disposal. The sewerage system constructed at Fort Chaffee consists of a collecting system, a sewage lift station of 4200 gallons per minute capacity, and two bio-oxidation ponds.

The collecting system of 335,990 linear feet was designed to serve a population of 20,000 men in the east area and 15,000 in the west area, based on a flow of 70 gallons per capita per day and a 3.2 peak flow factor for the connecting trunk sewer. Observation of the flow has indicated that these designating factors are very conservative and should the total troop housing facilities be increased as much as 50 percent, the sewer system will prove adequate. At present, excessive ground water infiltration is being experienced in the system and extensive repairs are needed. Repairs for the sewage collection system have been programmed for initiation in FY 1975, contingent upon funding.

The pump station was originally constructed as a lift station for emergency use during periods of high water in the Arkansas River. It is now being used as an integral portion of a force main system. Pumping equipment consists of three automatically controlled electric motor driven pumps with capabilities of 80 gallons per minute (gpm), 1,600 gpm, and 2,600 gpm, and one gasoline driven standby pump of 4,200 gpm. A mechanical bar screen and shredder is installed in the pumphouse ahead of the pumps. A project has been planned to replace the bar screen with a Roto-Strainer. This project will be initiated in FY 1975 contingent upon funding availability. A Parshall flume measures and records sewage flow to pumphouse equipment.

The original sewerage system included a 30-inch outfall line that discharged raw sewage directly into the Arkansas River at a point approximately 3 miles north and east from the post. Remedial measures were taken to prohibit discharge of raw sewage into waterways in compliance with the policies established by the State of Arkansas Act and the Federal Water Pollution Control Act. Manhole number 25 was plugged, the 30-inch sewer between manhole number 25 and the pump/lift station was converted to a force main sewer and two oxidation ponds were constructed. These ponds were designed for an intermittent peak occupancy of 7,500 personnel, flow rate of 100 gallons per day per person, and a loading rate of 40 pounds of BOD₅ (biochemical oxygen demand) per acre per day (0.20 pounds BOD₅ per person per day). The discharge of the 30-inch sewer is from open manhole number 25 located in the center of the first pond. Primary and secondary treatment is provided by the two ponds and the effluent discharges into Little Vache Grasse Creek and thence to the Arkansas River. Currently the effluent from the two ponds does not meet NPDES permit requirements. Further, modifications will be required to meet future standards, to become effective in 1977. As a result, a program was initiated in FY 1975 to provide sand filters and a chlorination system to meet current and future water quality standards.

(3) Natural gas. The natural gas supply for Fort Chaffee is purchased from the Ark-Okla Gas Corporation. It is delivered to the post through gas company facilities consisting of 10-inch and 12-inch high pressure mains that are connected to Stephens Production Company gas wells located in various gas fields in western Arkansas and eastern Oklahoma. The Fort Chaffee system as presently installed is adequate to furnish fuel required for the conversion of all heating equipment in the east area; however, additional loops are required to equalize the pressure for satisfactory operation. Gas service is not available for the west area. In the event of reactivation and/or expansion of this area, a new gas service of adequate size will be needed.

(4) Electric service. Fort Chaffee is supplied electric service over two 36 kilovolt (KV) three-phase circuits. These two lines terminate at Fort Chaffee number 1 substation on manually operated air break switches. One 36 KV line extends west 6.95 miles to the Carnall 66-36 KV substation at Fort Smith, Arkansas. The second line extends east 22.9 miles to the Branch 161-66-36 KV substation. Reclosing oil circuit breakers at both Carnall and Branch control these KV lines. Both oil circuit breakers are normally closed. Either of these substations can supply over 10,000 kilowatts of power to its 36 KV line, which is more than ample to supply all of the loads in this area. The Carnall substation is supplied from the VBI interconnection substation over 161 and 66 KV lines.

The Fort Smith area is further augmented by a direct 66 KV line from the Oklahoma Gas and Electric Company's Riverbank plant at Muskogee, Oklahoma. The Branch area has also been reinforced with a 69 KV line going north to Ozark to the Fitzhugh power plant owned by the Rural Electrification Administration (REA). This plant has a generating capacity of 50,000 KW.

The post distribution system of 439,496 linear feet of wire is a 4160 volt, 3 phase, 4 wire system which is served by two 2500 KVA, 36400/2400/4160-V substations. These substations are located adjacent to each other, and the two substations are within one wire fence inclosure. Totalizing oil circuit breakers are installed on the 4160-V side of each substation. The substations are also equipped with automatic voltage regulators. All feeder circuits leaving the substations are protected with automatic circuit reclosing circuit breakers which are located within the wire inclosure. There are several sectionalizing switches in the east area located at various points on the circuits for alternate emergency feeds. The main feeder consists of 4 - 2/0 bare copper wire. The overhead distribution system is protected throughout with lightning arrestors and multiple grounds. Pole line hardware, treated poles, adequate guys, and building services are considered in good condition. The system was constructed and has been maintained for joint construction of power and communication lines in compliance with the National Electric Safety Code.

Street lighting is served by 6.6 ampere, 2400-V constant current transformer with three substations which serves all street lighting circuits. The street lighting in the east area and in warehouse areas is presently being replaced with 110V mercury vapor lighting.

Six standby gasoline engine driven electric generating plants have been installed for emergency power.

e. Recent developments. There are two recent developments at Fort Chaffee. One is a 90mm and 105mm tank firing range located in the Artillery Impact Area. The other is a 20mm cannon and inert bomb range for F-100 and F-105 airplanes.

1.5 Description of environmental resources.

a. General.

(1) Physiographic and biotic region.

(a) Physiographic detail. Fort Chaffee, Arkansas, is situated in the Arkansas Valley section of the Ouachita Mountains province of the Southern Interior Highlands physiographic division.

The Arkansas Valley (figure 1-5) is up to 40 miles wide with the Arkansas River coursing through it from northwest to southeast. The ridges of the valley as seen in figure 1-6 are about 500 feet mean sea level and slope eastwardly. The parent soils material of sandstone and shale degrade to sandy, silty, and clay loams which are slowly to moderately permeable and of medium texture. Deciduous forest with some prairie and stands of shortleaf pine are the natural vegetation. The oak-hickory association predominates, however there are areas of the oak-hickory-shortleaf pine association to be found here. Commercial use of area lands runs to pasturing beef and dairy cattle, corn, and a wide variety of vegetables and fruits. The alluvial flood plain is planted to soybeans, corn, and oats.

(b) Biotic detail. L. R. Dice (1943) describes the area in which Fort Chaffee, Arkansas, is situated as belonging to the Carolinian biotic province. Blair and Hubbel (1938) describe the southwest portion of the Carolinian province as being the "Ozark biotic district." This area experiences about 42 inches of precipitation annually. The growing season lasts about 220 days each year. The principal trees are blackjack and post oaks, hickory, and elm. Sassafras is one of the prominent shrubs. South facing slopes differ in plant species from north facing slopes with the presence of shortleaf pine being the most discernible difference. The Arkansas River Valley contains various oaks with the addition of cottonwood, sycamore, birch, and willow. Persimmon is the predominate invader species. Lesser invasions are being made by sassafras and locusts. The oak-hickory association has bluestems and grama grasses as the predominant ground cover vegetation while the river flood plains have bluestems and Johnson grass. Principal wildlife species of economic importance which range throughout this area are whitetail deer, bobwhite quail, cottontail rabbit, mourning dove, and squirrel. Other game species familiar to the area include woodcock, waterfowl, and several species of fur bearers. As with other wooded areas near bottomlands, there are several hundred species of wildlife which are of value primarily to balancing the ecosystem and providing aesthetic appeal.

(c) Land use. Land use of Fort Chaffee consists of the following general categories:

<u>Use</u>	<u>Acres</u>	<u>Percent of Reservation</u>
Woodland	32,772	47
Native pasture	25,749	37
Improved pasture	7,711	11
Urban	5,747	5
Total	71,979	100



FIGURE 1-5
ARKANSAS VALLEY



FIGURE 1-6
ARKANSAS VALLEY RIDGES

b. Geological resources.

(a) Physiography. Fort Chaffee lies entirely within the Arkansas Valley section of the Ouachita province. The physiographic features within the reservation have been developed by stream erosion on a series of greatly deformed strata. In most parts of the area the strata have been folded into anticlines and synclines, and locally they have been broken by normal faults. The location and development of the topographic features have been controlled almost entirely by the character and attitude of the strata. Where the strata lie near horizontal, the most characteristic feature of the relief are large, broad-topped mountains and flat-topped or conical hills. Where the strata are tilted, long, curving ridges have been formed along the outcropping edges of resistant sandstone beds, and curving valleys follow the outcrops of the softer shale.

(2) Stratigraphy. Rocks of Middle Pennsylvanian age and unconsolidated alluvial deposits of Quaternary age are exposed at the surface, and rocks of Ordovician to Middle Pennsylvanian age have been penetrated by wells drilled in the area. The exposed stratified rocks of the district belong to the Atoka, Hartshorne, McAlester, and Savanna formations. They consist mainly of alternating beds of shale and sandstone, but they include some coal beds, and there is a lenticular bed of limestone in the upper part of the Savanna sandstone. Unconformities are present at the base of the Hartshorne and Savanna sandstones, and many small unconformities probably occur within the formations. Quaternary deposits of alluvial material are present in two terraces along some of the streams. The base of the upper terrace is from 50 to 60 feet above the present stream drainage, and the base of the lower terrace is from 6 to 15 feet above the present stream drainage. The deposits consist of clay, silt, sand pebbles, and cobbles of siltstone and sandstone, and boulders of sandstone as large as 3 feet thick, 4 feet wide, and 6 feet long. Alluvium has been deposited along many of the streams. It consists of clay, silt, sand, and pebbles of shale, siltstone, and sandstone; in some places cobbles and boulders of siltstone and sandstone are present at the base of the deposits. Alluvial material is present along the Arkansas River. The alluvium along the river generally is less clayey and contains coarser grains of quartz than the alluvium along the local streams.

(3) Structure. The bedrock within the reservation has been folded into eastward trending synclines and anticlines, and broken by normal faults. Crossing the northern part of the reservation are two synclines which are connected in the area southeast of Barling, Arkansas, by a normal fault. The syncline to the west is known as the Central syncline; the syncline to the east is the Bloomer syncline. Horseshoe ridges are formed near the ends of these where the erosion resistant strata turn and cross over the synclinal axis. Along the axis of the synclines, long hills such as the one south of Charleston in the Bloomer syncline

are found. In the deepest part of the synclines, where sandstone forms the cap, extensive mesa-like hills are present. Where the resistant cap is removed, sharp shale peaks or ridges are formed. South of these synclines is Biswell Hill, which rises about 400 feet above the surrounding valley. Its crest coincides with the crest of the Biswell Hill anticline, and both its crest and flanks consist of the Hartshorne sandstone, which is anticlinally arched. The hill is smoothly rounded and elongated, coinciding with the arch of sandstone. To the south and extending across the south side of the reservation is the Greenwood syncline. Outcrops of erosion resistant sandstone beds form long curving ridges along the flanks of the syncline such as Devil's Backbone and Little White Oak Ridges.

(4) Economic geology.

(a) Coal. The major coalfields in Arkansas lie partially under Fort Chaffee. The coal is bituminous, dark, and breaks into cubical blocks. It has high value and is low in moisture content. Large scale mining began here in 1870, and increased in activity with the completion of several railroads between 1870 and 1888. Production reached a peak in 1907 and continued rather stable until the early 1950's; since then it has been declining. The coalfields were first mined by a stripping process using horse-drawn scrapers. Later, underground mining, using room and pillar and longwall methods were the major means of recovery. Since 1958, large scale mechanized strip mining has become the dominant mining method in Arkansas. The Arkansas River navigation project provides cheap transportation for the coal market which is primarily the thermal electric industry. The estimated coal reserves in each coal bed under Fort Chaffee is tabulated below (Boyd).

Lower Hartshorne Coal Bed -----42,270,000 short tons

Charleston Coal Bed -----10,368,000 short tons

Paris Coal Bed-----558,000 short tons

Location of the coal beds are on file.

(b) Natural gas. The first commercial quantity of natural gas found in Arkansas was discovered in this region. Natural gas has been found in rocks of Silurian, Devonian, Mississippian, and Pennsylvanian age. Most of the gas is in rocks of Pennsylvanian age, in the Atoka Formation. The gas in Pennsylvanian rocks is lithologically entrapped, and structure appears to have little influence on the location or extent of gas accumulation. Natural gas in the Bonneville gas field near the southeast corner and the Bragg field south of the reservation are produced from sandstone units in the middle three-fifths of the Atoka Formation. The rocks containing the natural gas are present under Fort Chaffee; therefore, it seems reasonable

to assume that they would contain economically producible quantities of gas. Crude oil has not been discovered in West-Central Arkansas.

A report by Jess H. Henget, Petroleum Regulatory Engineer, dated October 29, 1959, entitled, "Report on possible oil and gas drainage of Fort Chaffee, Arkansas," provides a history of early gas exploration on and near Fort Chaffee. It lists the wells and their location, potential leakage from Fort Chaffee due to the wells outside of the reservation boundary, volumes of gas produced, and interests in leasing of reservation lands by oil and gas operators in the area.

(c) Construction materials. Approximately 6.4 square miles of the surface of Fort Chaffee is underlain by alluvial deposits of the Arkansas River. The alluvial deposits consist of clay, silt, sand, and occasionally gravel, and probably have an average thickness of about 40 feet. How much of the alluvial deposit is coarse enough to be of economic importance is unknown but 50 percent seems to be an acceptable number. Approximately 25.5 square miles of the surface of Fort Chaffee is underlain by the Hartshorne sandstone which probably has an average thickness of about 50 feet. The Hartshorne sandstone can be used as crushed stone in surfaced and unsurfaced roads, as blocks for riprap, as flagstone, and when sized, as building stone. How much of the Hartshorne sandstone is adaptable to each of the above uses is unknown. Shale in the McAllester Formation has been quarried for brick and tile.

(5) Soils. Soil classification on Fort Chaffee has been grouped into seven broad categories by the U.S. Soil Conservation Service. The greatest part of the reservation falls into the Linker-Hector Association. Along the ridge tops the Hector-Pottsville Association is found. On the lower slopes of the ridges, the Monongahelala-Tyler Association is evident, whereas the broad, level valleys that occur between the ridges fall into the Taloka-Parsons Association. Two soil associations, the Crevasse-Yohola and the Atkins-Stendel, are found adjoining the Arkansas River on Fort Chaffee. Flood plain soils of the Arkansas River reflect the association found in the flood plains of local streams, usually the Pope-Philo Association. A description of the various soil associations and their potential agricultural uses are on file.

The majority of the acreage on Fort Chaffee is from gently to moderately rolling; however, there are areas with moderate to steep slopes on ridges and hills. The soils are almost all susceptible to water erosion from moderate and intense storms, if left unprotected by vegetation. Wind erosion does not cause any problems. Most all areas of Fort Chaffee have a good vegetative cover, which prevents any major erosion problems. The only areas which do not have a good vegetative cover are the firebreaks, and some erosion on steep slopes is noticeable in wet years. There are

approximately 120 miles of firebreaks on the post. These breaks are generally on level ground with sides bordered by a good vegetative cover.

(6) Ground water. Although the consolidated rocks are the principal source of ground water, most wells will not yield more than 60 gpm. Small quantities of water can be obtained from wells 50 to 200 feet deep, but the depth to an adequate water supply is controlled by water-bearing openings intercepted by the well and not by rock unit. Depth of drilling is limited by the depth to salt water, which ranges from about 500 to 2,000 feet, but in most places is about 1,000 feet. Alluvial deposits of the tributary streams are not major sources of ground water because of their low permeability. Chemical analyses of well water in the consolidated rocks show that the sodium anion and the bicarbonate cation predominate in most of the rock units, that the dissolved solids content generally is less than 500 ppm, that the iron content is less than 2.0 ppm, and that the hardness is less than 200 ppm.

c. Hydrological resources.

(1) Climate. The average elevation of the cantonment area is 475 feet above mean sea level. This varies from the extremes of 380 feet in the river bottom to 1,214 feet on Pinnacle Ridge. The average annual rainfall for Fort Chaffee is 42.22 inches. During the last five years, rainfall has averaged 39.07 inches. Temperature extremes have ranged from minus 15 degrees to 113 degrees with the mean temperature being 61.8 degrees. The average date of the last killing frost in the spring is March 22; that of the first in the fall is November 7.

(2) Drainage. Records of major floods occurring during the last fifty years on the Arkansas River are on file. The river gage readings are taken one-half mile west of the reservation boundary. During the last ten years a series of locks and dams have been completed on the Arkansas River. The locks and dams have reduced the flooding by the Arkansas River. Even before the locks were completed Fort Chaffee experienced little problem with flooding. All buildings and roads are above floodwater level.

There are two principal drainage channels running through the cantonment area. The largest channel, Little Vache Grasse Creek, is approximately 40 feet wide with an average depth of 10 feet. It has an 0.8 percent fall, flowing south to north. The second channel is 20 feet wide with an average depth of 4 feet. It also runs south to north with a 0.7 percent fall. Both of these channels have been partially sodded with bermuda grass, which is the principal vegetation. Johnson grass and several other weedy species have invaded the bottom of these channels.

Approximately 29,000 acres of the Big Creek watershed lie within Fort Chaffee. Of this amount, about 500 acres are in the flood plain. Lands lying outside Fort Chaffee are affected by annual floods from the Big Creek overflow.

Some 8,700 acres of the 10,880 acre Little Vache Grasse Creek watershed lies within Fort Chaffee. All agricultural flood plain of any value lies within Fort Chaffee and is under agricultural lease to individual landowners. Flood damage is of minor importance.

Nearly all of the 23,000 acres of Vache Grasse Creek watershed lies within Fort Chaffee. The other major watershed is that of Massard Creek with some 2,200 acres lying within Fort Chaffee.

(3) Surface water. There are three large lakes on Fort Chaffee, Engineer, Darby, and Wells (figures 1-7, 1-8, and 1-9) that have surface areas of 40 acres, 115 acres, and 22 acres respectively. Other water resources on the post include 15 miles of Vache Grasse Creek, 12 miles of Big Creek, 8 miles of Little Vache Grasse Creek; also a marsh area covering about 80 acres and 12 developed springs. The Arkansas River (figure 1-10) also traverses the northern portion of the post.

Darby Lake, located in the Six Mile Creek watershed, has a drainage area of 1,376 acres. Surface area amounts to 115 acres. The lake was built originally by the U.S. Soil Conservation Service for flood control; however, the city of Charleston raised the dam to acquire storage for water supply and industrial use.

The towns of Charleston, Bloomer, and Lavaca have indicated a need for municipal water. Although present needs are adequate, they do not have an adequate supply for future population increase or for expansion and development. The U.S. Soil Conservation Service and the State of Arkansas Soil and Water Conservation Department have expressed interest in developing a multipurpose lake wholly within the Fort Chaffee reservation in the Big Creek watershed. However, water quality and soil analysis indicate that concentrations of mercury and lead are greater than those allowable under Federal health standards. Development of a lake in the Big Creek watershed is not likely.

d. Biological resources. Fort Chaffee lies in the "Ozark biotic district" of the Carolinian biotic province.

(1) Flora.

(a) Original vegetation. The original native trees were primarily winged elm (Ulmus alata), post oak (Quercus stellata), southern red oak (Quercus falcata), blackjack oak (Quercus marilandica), pin oak (Quercus



FIGURE 1-7
ENGINEER LAKE



FIGURE 1-8
DARBY LAKE



FIGURE 1-9

WELLS LAKE



FIGURE 1-10

ARKANSAS RIVER

palustris, common persimmon (Diospyros virginiana), white ash (Fraxinus americana), shortleaf pine (Pinus echinata), shellbark hickory (Carya laciniosa), eastern black walnut (Juglans nigra), black cherry (Prunus serotina), american sweetgum (Liquidambar styraciflua), and eastern red cedar (Juniperus virginiana). These trees still make up a large percentage of the wooded areas on Fort Chaffee.

The original grass cover consisted generally of little bluestem (Andropogon scoparius), big bluestem (Andropogon gerardi), Indian-grass (Sorghastrum nutans), switchgrass (Panicum virgatum), sideoats grama (Bouteloua curtipendula), Canada wildrye (Elymus canadensis), virginia wildrye (Elymus virginicus), Scribner's panicum (Panicum scribnerianum), tall dropseed (Sporobolus asper), and gramagrass (Bouteloua sp.).

Nuttall visited the area of Vache Grasse Creek and Cedar Prairie in 1819 and reported seeing species of Monarda, Tradescantia, Phlox, Verbena, and Delphinium.

When settlement began in earnest in the 1840's, the prairies and valleys were put under cultivation. The extensive bottom land hardwoods and the pine-timbered ridges succumbed to high-grade harvesting for homes and industrial wood uses.

With the establishment of Fort Chaffee in 1941 the former farm lands began revegetation by natural reseeding to native grasses, sedges, forbs, and shrubs. Along the streams and on the rougher ridges, the tree species of slow growing scrub-oak, hickory, and elm, began to reclaim their original forest lines. Despite poor range management practices and periodic fires, evidence of eastern red cedar, persimmon, and sweetgum indicate that the healing processes of nature are occurring. The ecological succession of the area has been impeded by grazing and fire.

(b) Basic vegetative types. Fort Chaffee is situated in a region composed primarily of four major vegetative types. These types are post oak-blackjack oak type, oak-hickory type, bottom land-hardwood type, and prairie type.

The post oak-blackjack oak forest is a mixture of upland forest and grassland ecosystems. The dominant overstory species in this type are post oak, blackjack oak, hackberry (Celtis occidentalis), and black hickory (Carya texana). The understory components are little bluestem (Andropogon scoparius), big bluestem (A. gerardi), sideoats grama (Bouteloua curtipendula), purple lovegrass (Eragrostis spectabilis), sand lovegrass (E. tricoides), Scribner's panicum, switchgrass (Panicum virgatum), Indiangrass, tall dropseed, coral berry (Symphoricarpos orbiculatus), winged sumac (Rhus copallina) and smooth sumac (R. glabra).

The oak-hickory forest is characterized by the following plants: Burr oak (Quercus macrocarpa), blackjack oak, post oak, white oak, (Q. alba), northern red oak (Q. rubra), pin oak (Q. palustris), black oak (Q. velutina), black hickory, mockernut hickory (Carya tomentosa), persimmon, white ash, shellbark hickory, shagbark hickory (C. ovata), bitternut hickory (C. cordiformia), winged elm, American elm (U. americana), hackberry, and basswood (Tilia americana).

The predominant plants in the understory are Virginia creeper (Parthenocissus quinquefolia), low blueberry (Vaccinium vacillans), wild grape (Vitis spp.), coral berry, sassafras (Sassafras albidum), greenbriar (Smilax spp.), spicebush (Benzoin aestivale), bladdernut (Staphylea trifolia), bloodroot (Sanguinaria canadensis), big bluestem (Andropogon gerardi), and hazelnut (Corylus americana).

The bottom land hardwood forest is composed of the following predominant plants: cottonwood (Populus deltoides), black willow (Salix nigra), American elm, green ash (Fraxinus pennsylvanica), sycamore (Platanus occidentalis), slippery (red) elm (Ulmus rubra), river birch (Betula nigra), water oak (Quercus nigra), overcup oak (Q. lyrata), post oak, blackjack oak, black walnut, bitternut hickory, shagbark hickory, hackberry, hawthorn (Crataegus spp.), redbud (Cercis canadensis), boxelder (Acer negundo), red maple (A. rubrum), and silver maple (A. saccharinum). Major understory plants are Virginia creeper, poison ivy (Rhus radicans), greenbriar, river cane (Arundinaria spp.), coral berry, pokeweed (Phytolacca americana), switchgrass, Johnsongrass (Sorghum halepense), purpletop (Tridens flavus), and big bluestem.

Somewhat unique to this area and to Arkansas, is the existence of small areas of prairie. Nuttall visited and described these prairies in 1919. They have continued to flourish with some noticeable encroachment by small, woody, herbaceous plants. One of the most prominent, and by far the largest vestige of prairie in this area is known as the Massard Prairie of which approximately 600 to 700 acres lie in the most western portion of Fort Chaffee. Armstrong and Moore have described the Massard Prairie in some detail. They indicated that the prairie consists of about 10,360 acres. The maintenance of this area as prairie is thought to be a combination of factors including soil characteristics, water table, fire, and climate. There are no large trees in the area. Trees that are found, such as cottonwood, willow, sassafras, and persimmon, are shrublike after 20 years of growth. A list of plants found on Massard Prairie is on file.

Principal species of the prairie include big bluestem, Indiangrass, arrowgrass (Aristida purpurascens), little bluestem, broom sedge (Andropogon virginicus), large flowered verbena (Verbena canadensis), several species of indigo (Baptisia spp.) panicum (Panicum spp.), and goldenrod (Solidago spp.). Sassafras, eastern red cedar, sumac, and persimmon are also prevalent.

(c) Orchards. At the time of acquisition of the lands for Fort Chaffee, several orchards of various kinds and sizes were also acquired. These orchards included approximately 76 acres of peach trees, 55 acres of pear trees, and 33 acres of apple trees. Due to the lack of proper care and orchard management practices the operation of Fort Chaffee as a military post, most of the orchards have deteriorated and have been overgrown to a point where they are hard to find. However, some of the trees are still bearing and are semiproductive.

(d) Dutch elm disease. Since its discovery in Blytheville and Paragould in 1961, Dutch elm disease has become epidemic all across the northern half of Arkansas. It is also increasing in the central portion of the State. Dutch elm disease is confirmed to be invading Fort Smith. Laboratory confirmation has been made by Dr. Frank H. Tamter, forest pathologist at the University of Arkansas. If the disease has not already invaded Fort Chaffee, it is expected that it soon will.

The disease is caused by a fungus which is relentless and fatal. It plugs up the vascular system of infected trees and kills them rather quickly.

(2) Fauna. The fauna, both aquatic and terrestrial, consists of species that are normally considered indigenous to the area. These include those species which permanently inhabit, seasonally abide, or rest during migrations on reservation lands and waters. Historically this region of Arkansas had an abundance of wild creatures. Nuttall and other travelers through Arkansas in the early 1800's reported the area to be teeming with wildlife. These travelers reported observing large herds of buffalo, elk, and antelope in the prairie type areas and abundant numbers of deer, beaver, otter, and wolves elsewhere. Except for deer and beaver these early inhabitants can no longer be found in the Fort Chaffee area. However, it is believed that the existing conditions are such that if the absent wildlife species were reintroduced on the Fort Chaffee reservation they would again prosper. Checklists of the more common faunal species are on file.

(a) Birds. Birds of Arkansas fall into six classes of migrants. These classes and example species include: (a) Permanent residents - cardinal, mockingbird, bobwhite, and tufted titmouse; (b) Resident species - robin, bluejay, field sparrow, kingfisher, and red-headed woodpecker; (c) Winter residents - various sparrows and rusty blackbird; (d) Summer residents - various warblers and the crested flycatcher; (e) Transients - various warblers; (f) Irregular transients - no well-known species in the Fort Chaffee area. A more comprehensive list of birds familiar to the Fort Chaffee area compiled by the Audubon Society is on file.

(b) Mammals. Mammals on the Fort Chaffee reservation are well represented by both predator and prey species. Predators are represented by the coyote, red and gray fox, and bobcat. Prey species include whitetail deer, cottontail rabbit, fox squirrel, raccoon, opossum, skunk, mink, muskrat, and beaver. In the last few years the armadillo has become more abundant on the reservation. These listed species occupy nearly all of the major niches of the habitat provided on Fort Chaffee lands.

(c) Fish. There are 193 fish species known to occur in Arkansas of which more than 20 are endemic to the drainages of the Ozark and Ouachita Mountains in Arkansas and neighboring states. There are four species which are found only in the State of Arkansas; they are: (a) Noturus lachner, the Ouachita madtom; (b) Noturus taylori, the Caddo madtom; (c) Etheostoma moorei, the yellowcheek darter; and (d) Etheostoma pallididorsum, the pale back darter. At least eleven species of fishes presently found in Arkansas are not native to the State. A key to these fishes and their distribution can be found in Thomas M. Buchanan's "Key to the Fishes of Arkansas." Those fishes known to inhabit the waters on Fort Chaffee are: largemouth bass (Micropterus salmoides), white crappie (Pomoxis annularis), black crappie (Pomoxis nigromaculatus), blue gill (Lepomis macrochirus), longear sunfish (Lepomis megalotis), redear sunfish (Lepomis microlophus), warmouth sunfish (Chaenobryttus gulosus), channel catfish (Ictalurus punctatus), flathead catfish (Pylodictis olivaris), blue catfish (Ictalurus furcatus), carp (Cyprinus carpio), alligator gar (Lepisosteus spatula), and longnose gar (Lepisosteus osseus).

(d) Species threatened with extinction. The southern bald eagle and the red wolf, both of which are listed by the Federal Bureau of Sport Fisheries and Wildlife as being threatened with extinction, have reportedly been observed on the reservation. Therefore, it would not be unreasonable to assume that other threatened species could find refuge and multiply in the environs of this military reservation.

Birds listed on the Arkansas endangered list that are known to have lived or frequented Fort Chaffee are as follows: (a) Declining in number, but still observed nesting; western kingbird, rufus crown sparrow, Bachman sparrow, short-billed marsh wren, Bewick wren, barn owl, and red-shouldered hawk; (b) Declining in number, formerly known to nest, not now nesting; double-crested cormorant, sharp-shinned hawk, golden eagle, least tern, greater prairie chicken, marsh hawk, and red-cockaded sparrow; (c) Migrating through the area, declining in number, formerly known to nest, not now nesting; peregrine falcon, osprey, bald eagle ruddy duck, red-billed grebe, king rail, grasshopper sparrow, yellow warbler, blue-winged warbler, Swensen warbler, purple gallinule, hooded merganser, and least bittern.

e. Archeological and historical resources.

(1) Archeological. A series of comprehensive studies and reports about early life along the Arkansas River was published from 1967 to 1969 by James a Schultz, Michael P. Hoffman, and Nancy E. Myer. Schultz and Hoffman's 1968 report, "An Archeological Survey of the Arkansas River Projects in Arkansas," and Hoffman's report on "Aerial Photography over Ozark Reservoir West-Central Arkansas" delineated the occupational history study areas.

Meyer's "Test Excavations in the Crooked Creek Site and East Popping Site, Ozark Reservoir, Arkansas," and Hoffman's "Controlled Surface Collections in Five Ozark Reservoir Sites" reports were combined and published in July 1967. In 1969 the University of Arkansas Museum published Nancy Myer's report, "Salvage Excavation in Four Sites in the Arkansas River Navigation Project Areas, Arkansas."

These studies indicated the earliest inhabitants along the Arkansas River were from the Paleo-Indian or Archaic period dating from 8,000 B.C. to 20,000 B.C.

There are no records of archeological resources within the boundaries of Fort Chaffee in the files of the Arkansas Archeological Survey according to Hester A. Davis, State Archeologist.

Although no surveys have been conducted in this area, archeological sites are likely to exist near reservation bottom lands and hills along the the Arkansas River. Archeological sites may be located along Vache Grasse Creek, Little Vache Grasse Creek, Big Creek, and the ridges overlooking these streams. An intensive survey of the reservation to locate sites would be necessary before their significance and the effect of training activities on them could be evaluated.

(2) Historical. The history of Fort Chaffee is but a small part of the history of the Arkansas River Valley. Starting in central Colorado, the Arkansas River flows eastward through Kansas to the city of Wichita, where it turns in a southeasterly direction through northeastern Oklahoma to Arkansas, flowing through Fort Smith and Little Rock into the Mississippi River.

The earliest explorers of the Arkansas River were the Spanish adventurers Coronado and De Soto in approximately 1542. Coronado explored the middle section of the Arkansas River in Colorado and Kansas, while De Soto journeyed to the lower end of the river through Oklahoma and Arkansas, encountering the peaceful Quapaw Indians, whom he enslaved.

The period from 1673 to 1750 saw the French continue the exploration of the Arkansas River Valley that was initiated by the Spanish. Among the more notable French explorers were Marquette (1673), Joliet (1673), and La Salle (1682). The Arkansas River Valley changed hands from French to Spanish when France ceded the land to Spain during the French and Indian War in 1763, only to regain it when Spain ceded the region back to France in 1800.

With the Louisiana Purchase from France in 1803, the United States gained possession of this valuable territory. Among the earliest of the American explorers were Zeb Pike and Lieutenant James B. Wilkinson (the son of General James Wilkinson), who departed from Belle Fontaine near St. Louis (1806). Zeb Pike explored the upper stretches of river into Colorado, while Lt. Wilkinson went downriver into the Fort Smith-Fort Chaffee area. The Fort Smith-Fort Chaffee area at that time was considered part of the Missouri Territory as a result of the Louisiana Purchase. (Coyes, 1895).

During this period, the territory of eastern Oklahoma and western Arkansas was heavily populated with Indian tribes who were constantly at war with one another. This area furnished to the Indians their choicest hunting grounds. The bank of the Arkansas River where Fort Smith now stands served as a camping ground for the Arkansas, Osages, Shoshones, Comanches, and Quapaws. It served as a convenient location for them to prepare for the long river trips to either the northwest or the eastern route to the south. (Patton, 1959).

The internecine battles among the Indians caused Major William Lovely, agent of the Cherokees, to recommend that the National Government establish a military post on the banks of the Arkansas River to maintain peace and order among the Indians. General Andrew Jackson, head of the Southern Division of the U. S. Army, was directed in 1817 to establish a post on the Arkansas River to be garrisoned by one company. General Jackson, in turn, communicated these orders to General Thomas A. Smith who was commander at Belle Fontaine. General Smith ordered Major William Bradford in company with Major Stephen H. Long, a member of the Topographical Corps, to descend the Mississippi River from St. Louis to a point where it intersected the Osage Line as determined by the Osage Treaty of 1808. The two officers were to select the most suitable site near that line and erect a stockade adequate for the accommodation of one company.

The site selected was known as Belle Point. In his report to his commanding officer, Brigadier General Thomas A. Smith, 16 May 1818, Major Long says: "This place (Belle Point) is situated in north latitude 35 deg., 23 min., 12 sec., at the junction of the Poteau River, four hundred and sixty miles from the mouth of the Arkansas, pursuing its meanderings, and about twenty miles above the Osage boundary line." (Bearss, 1962).

It was customary in military circles to name forts after noted military men. Belle Point was named Cantonment Smith in honor of General Thomas A. Smith who had sent out the order to establish the new fort. By December 1818, Cantonment Smith was known as Fort Smith.

The construction of Fort Smith did not induce rapid settlement as frequently happened when a new fort was built in a wilderness area. Few settlers came into the area. Some of the soldiers who first came to garrison the post became permanent settlers. Among them was Aaron Barling for whom the town of Barling is named. Later, in 1821, Major Ben Moore from Virginia brought cotton and tobacco cultivation to the Fort Smith and surrounding area. (History of Benton, 1899).

Notable at this time were the explorations of Thomas Nuttall, a botanist, who traveled up the Arkansas River. Nuttall explored the Fort Smith-Fort Chaffee area, describing the flora and fauna as he traveled.

The presence of the fort and the soldiers played a major part in reducing the warfare among the Indians, although sporadic incidents still occurred. The United States and the Choctaw Nations agreed on a treaty in 1820. Included in the Choctaw lands was a triangular piece of what is now Arkansas and the site of the original fort, along with the present Fort Chaffee area. Later, in 1825, a new treaty was made with the Choctaws whereby the eastern boundary line of the Choctaw lands was fixed as a line beginning on the Arkansas River 100 paces east of Fort Smith and running due south to the Red River.

Settlement still proceeded slowly. By reference to dates, it will be observed that the settlement of the territory of Sebastian County began at Fort Smith in 1817 and then followed down the river. The portion bordering on the river was first settled, but the central and southern portion of the county (Fort Chaffee area) was not settled to any considerable extent until after the year 1840. Prior to 1850, the county was settled very slowly, after that more rapidly. (History of Benton, 1889).

Captain John Rogers was the first white settler to settle on the site of Fort Smith in 1824. He soon opened a trading post and maintained a prosperous business. At the time of Captain Rogers settlement, the original stockade of Fort Smith was abandoned and soon fell into disrepair.

Fort Smith, after its evacuation by the 7th Infantry, served as headquarters for military survey and road building crews during the 1820's. Military planners recognized its strategic location on Belle Point. All primary roads radiated from it.

By means of a series of bills which were enacted between 1825 and 1827, Congress authorized the construction of a system of military roads on the Arkansas frontier, all focusing on Fort Smith. One road, known as the Old Military Road, ran east from Fort Smith to Little Rock, traversing the Fort Chaffee area. (Butler, 1972).

During the early 1830's (1830-35), the government committed itself to moving all the eastern Indian tribes to the Indian Territory west of Fort Smith. Treaty followed treaty, but in reality, it was a forced movement of thousands of Indians from their homes in the eastern part of the nation to the raw frontier lands of Indian Territory. The Indians called the forced movement the "Trail of Tears" referring to the various routes taken by the tribes. Not only did they lose their homes, but thousands of Indians died on the march west from disease, exposure to the elements, lack of food, and other hardships. Families were separated, lost, or died as the thousands of Indians trudged westward by foot, horseback, wagon and boat. A few of the routes ("Trail of Tears") used by the Indians crossed the Fort Chaffee area.

As many of the Indians settled in the Fort Smith-Fort Chaffee area, citizens of the white settlements in Arkansas territory became alarmed by the increasing migration of the Indians and hostile fighting which again broke out among some of the tribes. The Arkansas settlers demanded the re-establishment of Fort Smith. Political pressure was exerted in Congress, and in April 1838, the Secretary of War was ordered to establish a permanent fort near the earlier Fort Smith, part of which was still standing.

A large number of people, both white and Indian, had settled in the Fort Smith-Fort Chaffee area. The valleys of Vache Grasse and Big Creek were well settled on the present site of Fort Chaffee. Among the prominent settlers were William Ward, Sandy Ake, and Judge Charles Milor. Due to the recent and large settlement, it became necessary to change the role of Fort Smith from just a garrison of troops for protection of the settlers to that of a supply depot for the more westerly posts. Also, with Fort Smith being the headquarters of navigation of the southwest, it was chosen as the proper spot for a supply fort. The owner and operator of the new supply depot was none other than Captain John Rogers, the first white settler of Fort Smith. (Butler, 1972).

Fort Smith was incorporated in 1842 and continued to grow due to the protection afforded by the opening of the new fort. During the years following the completion of the new fort up to the outbreak of the Civil War in 1861, Fort Smith was the focus of the southwestern frontier. It served as a base for arming and equipping military units for service in the Mexican War and as headquarters for exploration and reconnaissance parties ranging over the southwest to the Pacific. Fort Smith was also the mother post for new military stations across the southwest. (Bearss & Gibson, 1969).

An exciting part of the development of Fort Smith and the entire area of northwest Arkansas was the period of the Butterfield stages. Communication with both the east and west coasts of the nation became a reality in 1858 for Fort Smith as both the Butterfield Overland Mail Service began, and the Missouri River and Western Telegraph Company installed a line from St. Louis to Fort Smith, allowing messages from the east coast to reach the frontier river town in a few hours.

John Butterfield, a New Yorker, contracted with the Post Office Department in 1857 to carry all letter mail from St. Louis and Memphis to San Francisco. The stage routes from Memphis and St. Louis merged at Fort Smith. The stage route ran out of Fort Smith southwest and on to California. The Memphis branch of the Butterfield Overland Mail route actually was a variety of different routes, combining river travel and road travel to bring the mail to Fort Smith. The stage ran from Memphis to Little Rock to Fort Smith.

The usual course of the Memphis to Fort Smith route was from Memphis to Madison, to Des Arc, to Atlanta in Prairie County, thence to Cadron in present Faulkner County, Plummer's Station (Plummerville), Lewisburg, Hurricane, Potts Station (Pottsville), and Norristown in Pope County. At Norristown, mail was carried across in a boat to Dardanelle, and there the route was approximately that of present Highway 22 through Paris and Charleston to Fort Smith. This route traversed the northern portion of the Fort Chaffee area. (Worley, 1959).

During the period of 1858 to 1861, the Butterfield Overland Mail route from St. Louis to San Francisco, covering 3,000 miles in 25 days, was the longest mail route in the world.

The Butterfield Overland Mail Company and the service it provided, along with the increased steamboat traffic on the Arkansas River, and the network of military roads fanning out in all directions from the town, helped make Fort Smith a central point of commerce and communication for the southwest frontier.

The progress and growth of Fort Smith were temporarily halted by the start of the Civil War in 1861. Fort Smith was garrisoned by Federal troops under the command of Captain Samuel D. Sturgis. Sturgis was preparing to evacuate Fort Smith as soon as Arkansas seceded from the Union to join the Confederacy, as the loyalty of the majority of its citizens, including the Cherokee and Choctaw Indian tribes, was solidly behind the south.

A force of 300 volunteers gathered in Little Rock for an assault on Fort Smith. On 21 April 1861, the Arkansas volunteers boarded the steamboats Frederick Notrebe and Tahlequah to journey upriver to Fort Smith and demand the surrender of the fort. With the report of advancing Confederate troops, Captain Sturgis evacuated the fort on 23 April during the night and led his men and supplies safely across the Poteau River before the townspeople knew of his departure. The Arkansas volunteers marched into an empty fort and claimed it for the Confederacy, although the state of Arkansas had not seceded from the Union and did not do so until 6 May 1861, more than two weeks after the capture of the fort.

Fort Smith's strategic location made it the command center for Confederate troops, acting as a defensive buffer against invasions of Arkansas, Texas, and Louisiana from the northwest. It served as a Confederate military post until 1 September 1863.

Realizing the military importance of Fort Smith, the Union army began a thrust toward the fort in January 1862. After a series of devastating victories, the Union troops advanced on Fort Smith and encamped throughout the territory around Fort Smith. Numerous skirmishes erupted around the Fort Smith vicinity during the spring and summer of 1862. The skirmishes finally led to the battle of Massard Prairie which extends to the western portion of Fort Chaffee. It is not known exactly where, on the prairie, the battle occurred. However, soldiers of both armies freely roamed and camped in the Fort Chaffee area. A camp of 5,000 Union troops was attacked by a force of 2,000 Confederate mounted troops in an assault that caught the Union troops completely by surprise. The Confederates captured horses, food, supplies, and weapons and killed many of the Union troops before withdrawing.

In December 1862, the Union troops advanced as far as Van Buren before marching north to Missouri because of a lack of food for men and horses. Had they moved on to Fort Smith, they would have found it abandoned, as the Confederate commander, General Hindman, evacuated his troops in the face of overwhelming odds.

January 1863 brought a new commander to Fort Smith, Confederate General William Steele, who found few men and dismal conditions at the fort. Supplies and equipment were short, and the men were demoralized. In addition to his problems, the country around Fort Smith was teeming with hit-and-run parties of Union raiders who plundered farms and robbed and killed citizens all over the area surrounding Fort Smith.

During the summer of 1863, Union troops under General Blount continued to move through Indian Territory in their advance on Fort Smith. General Steele knew there was no hope of withstanding the Union force and evacuated the fort during the night of 31 August 1863. The next day, 1 September, Union troops attacked the fort only to find it deserted. During the next two years, Fort Smith existed as a post for the Union army. The small garrison of 2,000 troops endured constant harrassment from raiding Confederate troops out of Texas and from Indian troops.

While the war endured, civilians suffered. Confederate raiders and guerrilla bands continued to wreak havoc on the civilian population of the area. Civilians began pouring into Fort Smith during the spring and summer of 1864. They were evacuating their homes because the rampaging armies had ruined them. With the end of the war on 9 April 1865, a small measure of peace settled on the area.

The Civil War had a devastating effect on the Fort Smith-Fort Chaffee area. The economy had been destroyed. Raiding parties and guerrilla bands had destroyed the majority of farming operations in the area. There were only scant supplies of food and clothing on hand. Of necessity, the citizens banded together with the army to farm the abandoned plantations along the Arkansas River. During this reconstruction period, Fort Smith was the center of army life and civilian commerce as rebuilding began all along the border.

As the frontier moved further west, the military post of Fort Smith was no longer important as a supply depot. In November 1871, a United States marshal took charge of the post.

Fort Smith and the surrounding territory never had the reputation of being a gentle, civilized area. Before the Civil War the town had been progressing along the lines of civilization and culture. The effects of the Civil War halted this progress. Outlaw gangs ran rampant until justice and order were brought to this territory by Judge Isaac C. Parker.

In 1875, President Grant appointed Judge Isaac C. Parker to preside over the United States Court for the Western District of Arkansas. Because of his belief that the wicked should be punished and that it was his duty to drive the criminals from the territory, Judge Parker did not hesitate to pronounce the death sentence by hanging. He quickly gained fame as the "hanging judge", and the Fort Smith jail was known as "hell on the border." The death of Judge Parker in 1896 signaled the end of an era of crime that had flourished along the Arkansas frontier.

After the Civil War, up to 1900, more settlers were moving into Arkansas. By 1903, the Fort Smith-Fort Chaffee area was fairly well settled and platted. Communities had sprung up in and around the Fort Chaffee area. This area was settled by people from Ohio and the northern states and refugees from plantations in Louisiana and Mississippi. The soil in this area was considered very good for cultivation, with the majority of the cropland used for cotton cultivation. Cotton became the money crop of the area. Farmers were dependent on the cotton crop for next year's money. The settlers lived simply. Usually they started out with a small farm and gradually added additional acres to it. One of the main hardships for the farmers was the occurrence of typhoid fever caused by poor sanitary conditions. The outbreak of typhoid fever devastated families and communities in the Fort Chaffee area. (Taped conversation with Mrs. Thelma Brown, resident of Sebastian County).

The twentieth century witnessed the transformation of Fort Smith from a wild frontier town into a first class city known as the "Queen City" of the southwest. By 1910, the population numbered 30,000, and the city continued to expand in the 1900's as coal mining, manufacturing, and agriculture formed the bulk of the economic base.

With the advent of World War II, the U. S. military again assumed a dominant role in the history of the Fort Smith area. In September 1941, it was announced that construction would begin on a new military camp. This \$15 million project was named Camp Chaffee in honor of Major General Adna R. Chaffee, first chief of the U. S. Army armored force. Camp Chaffee was located approximately 17 miles east of Fort Smith and covered approximately 90,000 acres of land which was purchased by the Government from the local farmers and landowners.

The sale of land to the Government for Fort Chaffee created a hardship on the sellers. The farmers and landowners felt that they did not get the proper monetary value for their land. When Camp Chaffee purchased the land, the people in residence were required to move out and buy new farms and homes. Unscrupulous landowners knew that these displaced people would need new farms and homes and raised the price of their saleable land. The new farms and homes

were sold at inflated prices, and the land was often inferior to their former property. After selling their property to the Government, many people moved away to other communities (Greenwood, Charleston, and Fort Smith) or to Oklahoma, to start over. (Taped conversation with Mrs. Thelma Brown, resident of Sebastian County).

The location of Camp Chaffee was considered excellent for several reasons. Climatically, it offers a variety of conditions ranging from winter cold to severe summertime heat. The area is rich in coal and natural gas, and the water supply is readily available. Fort Smith offers convenient air, bus, and rail transportation.

There was hardly a facet of life in the Fort Smith area which was not touched by Camp Chaffee. The construction of the camp provided employment for 5,000 persons and once constructed, the camp became a large volume customer for supplies of almost every kind. Many soldiers married local girls and settled in the Fort Smith area just as their predecessors had done 100 years earlier.

The camp was originally designed as an armor training area. The first troop trains arrived on 26 March 1942 bringing 600 men of the Sixth Armored Division to Chaffee. A total of three armored divisions received their training at Chaffee, and training facilities were also used by infantry regiments, field artillery groups, engineer groups, and several ordnance and quartermaster battalions.

Camp Chaffee was also used as a prisoner-of-war camp. The POW camp was established at Chaffee in November 1942 to incarcerate German prisoners. The German POW's were used to assist on construction projects and to help the local farmers harvest their crops. The POW camp ended with the release of the last prisoners in May 1946.

With the war successfully concluded, Camp Chaffee was deemed expendable and was placed on inactive status on 31 July 1946. The camp was reopened in July 1948 but again deactivated in less than two years.

The Korean War caused Chaffee to reopen only three and one-half months after closing. On 1 August 1950, Camp Chaffee was reactivated to provide basic, advanced field artillery and specialist training to recruits.

On 21 March 1956, came word of official confirmation of the permanent status of the camp, with its new designation as Fort Chaffee. Ceremonies were held to note the official title change. Once again there was an official military fort at Fort Smith.

The fort was again deactivated in July 1959 and reopened in September 1961 because of the Berlin crisis. In July 1965, Fort Chaffee was closed and placed in caretaker status. It is presently used for National Guard and Reserve unit training, primarily during the summer months.

HISTORICAL CHRONOLOGICAL CALENDAR

- 1500's Prior Quapaw Indian home
- 1542 - Spanish explorers Coronado (middle Arkansas River) and DeSoto (lower Arkansas River)
- 1673 - French explorers Marquette and Joliet (lower Arkansas River)
- 1682 - LaSalle (lower Arkansas River); Henri de Tonti (Arkansas Post, now St. Charles)
- 1719 - Bernard de la Harpe (descended Arkansas River)
- 1739 - Peter and Paul Mallet (descended Arkansas River)
- 1740-50 - French expeditions up the Arkansas River
- 1763 - France ceded the territory to Spain during the French and Indian War
- 1800 - Spain ceded the region back to France
- 1803 - Louisiana Purchase from France
- 1806 - Zeb Pike explored upper Arkansas River Basin westward to Colorado; Lt. Wilkinson descended the Arkansas River
- 1817 - Stephen H. Long expedition to determine the site for a new fort; Fort Smith established on Belle Point
- 1818 - Quapaw Indians received land by treaty, western boundary at Little Rock
- 1819 - Territory of Arkansas created; David Meriwether explored upper Arkansas River; Thomas Nuttall explored the Fort Chaffee area and described the flora and fauna

- 1820 - Choctaw Treaty included in the Choctaw lands a triangular piece of what is now Arkansas and the site of Fort Smith
- 1821 - Capitol of Arkansas moved to Little Rock from Arkansas Post; Major Ben Moore from Virginia brought cotton and tobacco cultivation to the Fort Chaffee area
- 1822 - First steamboat to Fort Smith
- 1824 - Captain John Rogers, first white man settled on the site of Fort Smith; original fort at Fort Smith abandoned; Quapaw Indians ceded land from 1818 treaty back to U.S.
- 1825-27 - System of military roads constructed on Arkansas frontier all centering on Fort Smith; old military road ran east from Fort Smith to Little Rock and crossed Fort Chaffee
- 1825 - Choctaw Treaty fixed boundary of western Arkansas territory as beginning 100 paces east of Fort Smith encompassing the Fort Chaffee area
- 1830-35 - "Trail of Tears"; removal of Indians from the east to Indian Territory in the west; some routes went through Arkansas near Fort Smith, crossing Fort Chaffee
- 1836 - Arkansas became 25th State
- 1838 - U.S. military post constructed at Fort Smith
- 1840-50 - Settlement increases with the opening of the new fort
- 1842 - Fort Smith incorporated
- 1858 - Butterfield Overland mail service begins, route crosses Fort Chaffee; Missouri River and Western Telegraph Company installed a line from St. Louis to Fort Smith
- 1861-64 - Civil War; skirmish at Massard Creek
- 1865 to 1900 - Second large group of settlers came after the Civil War, mostly from Ohio, Tennessee, Georgia, and Mississippi
- 1875-96 - Era of Judge Isaac Parker known as the "Hanging Judge" and the Fort Smith jail known as "Hell on the Border"
- 1903 - Area was fairly settled and platted

- 1900-30 - For Smith population reached 25,000; coal mining, manufacturing, and agriculture are main industries
- 1941 - Camp Chaffee activated for combat training during World War II
- 1942-46 - Camp Chaffee also used as a POW camp for German prisoners
- 1946-56 - Camp Chaffee gained permanent status with the accompanying title change to Fort Chaffee
- 1959 - Fort Chaffee deactivated
- 1961 - Fort Chaffee reactivated
- 1965 - Fort Chaffee closed and placed in caretaker status; presently used for National Guard and Reserve unit training primarily during the summer months

f. Social, cultural, and economic resources. This portion of the assessment describes social and cultural resources that adjoin or are interrelated with activities at Fort Chaffee. Fort Smith's Standard Metropolitan Statistical Area (SMSA) is the immediate area of influence relative to Fort Chaffee. This includes Sebastian and Crawford Counties, Arkansas, and LeFlore and Sequoyah Counties, Oklahoma. Franklin and Logan Counties, Arkansas lying just outside the SMSA are also considered to be in the immediate area of influence.

OBERS area 118, (Fort Smith, Arkansas-Oklahoma), plate 1-1, one of 173 economic areas designated as water resources economic study areas, is considered the larger area of influence. It is composed of 13 counties, 7 in Arkansas and 6 in Oklahoma.

(1) Population. Sebastian County population in the 1970 census was 79,237, a 19 percent increase over the 1960 population of 66,685. Smaller Crawford and Franklin Counties, with 1970 populations of 25,677 and 11,302 showed increases of 20 percent and 11 percent, respectively, over the 1960 census populations.

The city of Fort Smith, largest population center in the area, increased in population from 52,991 to 62,802 between 1960 and 1970 (the same 19 percent increase as Sebastian County in which it is located).

Nearby smaller communities and their populations are Charleston, 1,497, located 2 miles north of the northeast corner of Fort Chaffee in

Franklin County; Booneville, 3,239, located 6 miles east of the southeast corner of the installation in Logan County; and Greenwood, 2,032, located 1 1/2 miles south of the post in Sebastian County. Population trends in these communities are expected to continue upward but at a slower rate.

(a) Population characteristics. OBERS area 118 showed a 12.5 percent loss in population between 1950 and 1960, and a 13.9 percent population gain from 1960 to 1970. Infant mortality rates in the area during 1964 were about 1,560 per 100,000 live births, compared to a national norm of about 1,700. 1970 population density for the area was 26 persons per square mile, while that for the U. S. was 57.4 persons per square mile.

In 1970 the percent of population in the area over 25 years old with 4 years of high school education or more was 36 percent, opposed to 52 percent for the Nation.

Per capita personal income in 1969 for residents of the area was \$2,099, or about 57 percent of that for the Nation. In area 118, 26.4 percent of the 1970 population received less than poverty level income in 1969 (U.S. = 13.7 percent).

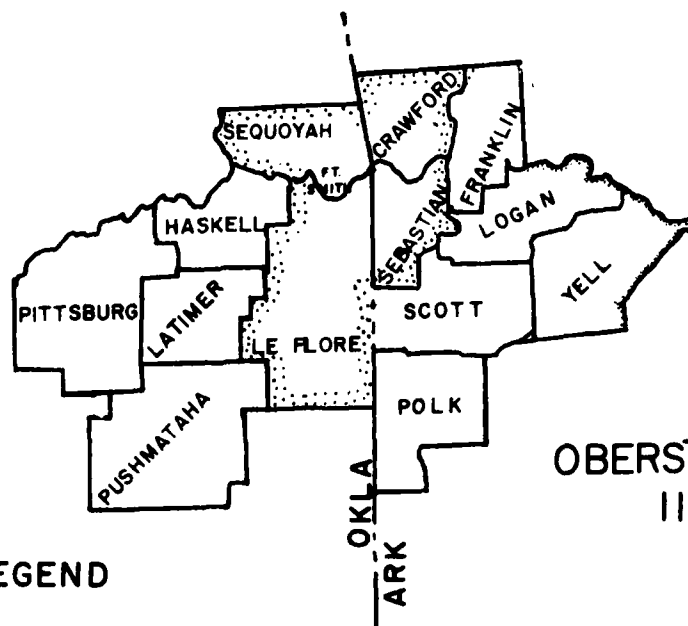
Of the area's workers in 1970, 6.4 percent were agricultural, while the percentage for the Nation was 3.8 percent.

Divorces granted within the area in 1968 totaled 4.9 percent per 1,000 population in 1970, exceeding the 2.9 ratio experienced by the Nation.

(b) Socioeconomic profile indicators. Many socioeconomic characteristics are intangible or lacking a value scale; therefore, they must be measured or compared with either a norm or some other contrived base. In doing so, an index can be developed which will depict variance from that norm. The data given in table 1-7 and figure 1-11 provide a useful base to measure changes over a period of time as they might relate to Fort Chaffee activities.

Population data are based on the Bureau of the Census definition of population as "place of residence." As an exclusive indicator, population has a very limited meaning; however, when developed over a time series, or when used with other indicators such as income or square miles of land area (density), population data become highly important.

The indicator in figure 1-11 and table 1-7 "workers to nonworkers" is the ratio of persons in the labor force to persons not in the labor force at the time of the census. It includes persons under 14 years old.



OBERs* AREA
118

LEGEND

- ⊙ Places of 100,000 or more inhabitants
- Places of 50,000 to 100,000 inhabitants
- Places of 25,000 to 50,000 inhabitants outside SMSA's

----- Standard Metropolitan Statistical Areas(SMSA's)

*OBERs is a descriptive title of a program of economic measurement, analysis, and projection conducted by the U.S. Department of Commerce and the U.S. Department of Agriculture.

PLATE 1-1

OBERs AREA 118

The "percent of workers nonagriculture" indicator is an industry classification which relates all employment, other than agricultural, area in 1970. The measure, though not usually stated in comparable dollar values, broadly represents the relative affluence of residents.

"Percent of persons in poverty, 1969" is a statistical measure based on census definitions of poverty level income in a given area. The percentage is based on computation, not an actual count of individuals; however, authorities consider it a reflection of the extent to which poverty exists among groups and populations of areas.

"Percent of population with high school education or more in 1970" is a measure of educational attainment of persons over 24 years of age. Educational attainment often closely correlates per capita income and the productivity of human resources in an area.

"Infant mortality rate, 1964," when measured over a multiple county area, is a proxy measure of general health status at that time.

"Divorce rates, 1968" reflect the degree of disparity between OBERS area 118 and the Nation in number of divorces in 1968 per 1,000 population (1970 census). The measure was included in the profile largely to advance the theory that divorce rates are negatively related to per capita income in an area. Data on the number of divorces in Arkansas counties in 1968 were obtained from the 1972 Arkansas Almanac and for Oklahoma counties by telephone request from the Oklahoma State Bureau of Vital Statistics.

The Bureau of the Census defines "percent of population born in State of residence, 1970" as a computation of data from a population sample which reflects the percentage of persons born in the State in which they were residing at the time of the census. The indicator appears to measure population mobility; however, the Bureau of the Census cautions against its unlimited application.

Table 1-7
SUMMARY OF COMPUTATIONS FOR SOCIOECONOMIC PROFILE:
OBERS AREA 118 RELATED TO THE U. S.

Selected Indicator	County SMSA	Groupings NMSA*	United States
Population growth, 1950-1960	-0.80	-20.00	18.50
Population growth, 1960-1970	18.70	10.40	13.20
Ratio workers to nonworkers, 1970	0.58	0.51	0.69
Percent of workers to non- agriculture, 1970	96.30	91.40	96.30
Per capita personal income, 1969	2222.00	1946.00	3698.00
Percent of persons in poverty, 1969	23.80	29.60	13.70
Percent of persons over 25 with high school education or more, 1970	42.00	29.00	52.00
Infant mortality rate, 1964	1557.00	1547.00	1700.00
Divorce rates, 1968	5.40	4.30	2.90
Percent of population born in State, 1970	67.00	70.00	65.00

*Nonmetropolitan Statistical Area County

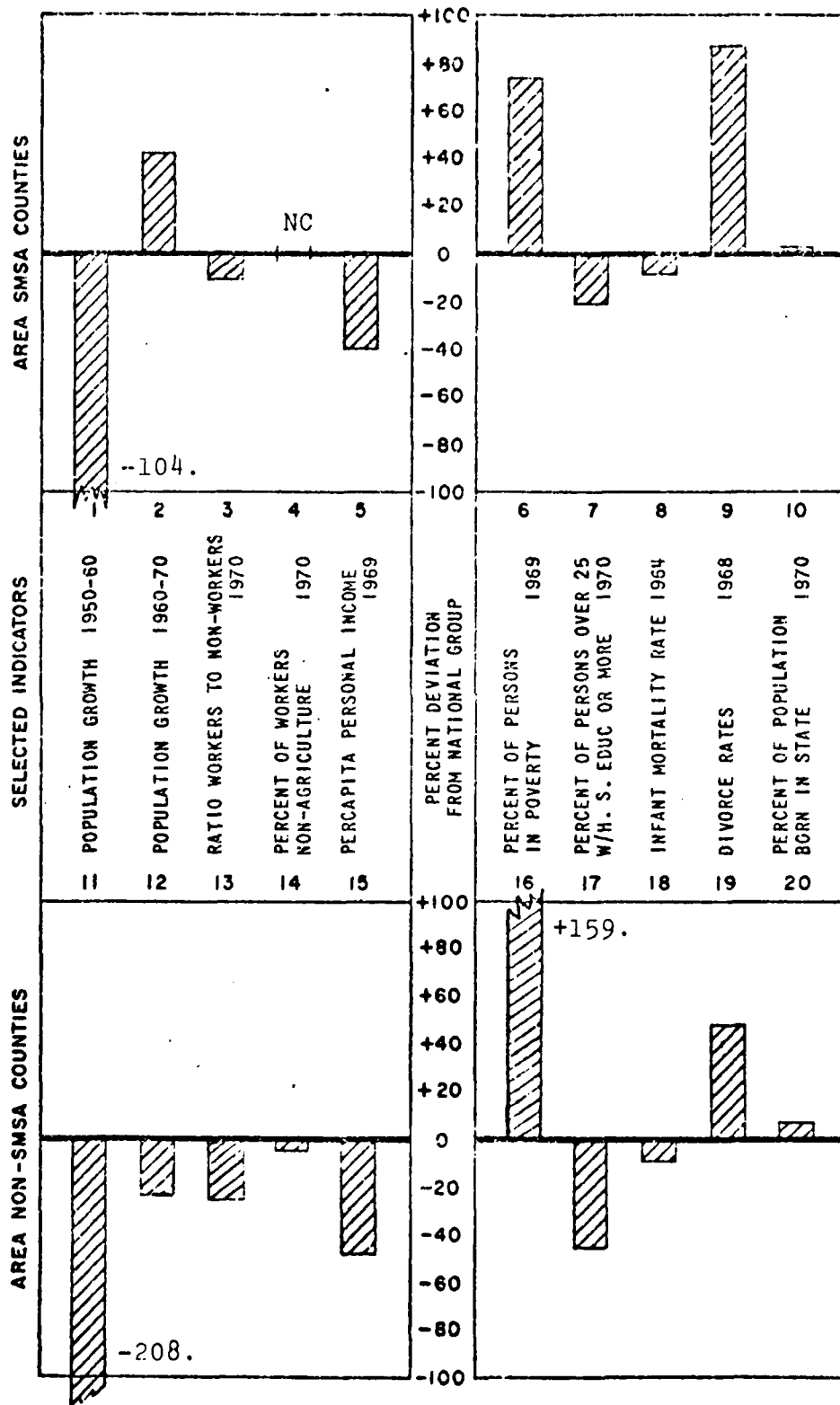


FIGURE 1-11
SOCIOECONOMIC PROFILE CHART, OBERS AREA 118

(c) Ethnic composition. Ethnic composition of the people living in the Fort Chaffee area is comparable to other areas of the United States. The black population composes less than 10 percent, somewhat under the State average of over 20 percent. Evidence exists of older German communities in the area.

(2) Recreational opportunities. An 800-acre regional park developed by Sebastian County lies on land adjacent to Fort Chaffee which was deeded to the county by the Government. The park provides a variety of facilities, including an amusement park, swimming pool, and picnic areas, in addition to recreational opportunities afforded by existing facilities at Fort Chaffee.

A national historic site is included among three city parks, five neighborhood parks, and four community parks in the Fort Smith park system. A long-time deficiency of parks in the system, especially neighborhood and city parks, is alleviated somewhat by the county regional park. Other outdoor recreational facilities are either private or semiprivate and are not included as public parks.

A number of State parks in Oklahoma and Arkansas are within easy driving time and access to Fort Chaffee. These include Sequoyah, Lake Wister, Tunkiller, and Fountainhead State Parks in Oklahoma, and Devil's Den, Lake Fort Smith, and Petit Jean State Parks in Arkansas.

Additional camping and fishing opportunities are provided by the two national forests that surround Fort Chaffee; Ozark National Forest to the north, and Ouachita National Forest to the south and east.

Rivers and lakes offering a variety of outdoor recreation including boating, fishing, camping, picnicking, etc., are found in abundance, principally on U.S. Army Corps of Engineer lakes and the McClellan-Kerr Waterway on the Arkansas River.

(3) Transportation. Rail service is provided by the Missouri Pacific Railroad, which is connected to nearly 8 miles of railroad spurs on Fort Chaffee, and by the Frisco and Kansas City Southern Railroads.

Highway access to the area is provided by Interstate 40, 8 miles to the north, and U. S. Highway 71, immediately to the southwest. State Highways 22 and 59 run along the northern boundary, State Highway 96 crosses the center in a north-south direction, and State Highway 10 parallels the southern boundary of the installation.

The McClellan-Kerr Navigation System crosses the northward extension of Fort Chaffee at lock and dam number 13 on the Arkansas River. Port facilities are available at Fort Smith and Van Buren, Arkansas.

Fort Smith Airport, located 6 miles to the west has daily flights to all major cities in the south central United States.

A bus terminal in the city of Fort Smith, some 10 miles distant, is served by Continental Trailways, Greyhound, and Jefferson and Oklahoma Transportation Lines.

(4) Education, public health, welfare, and safety.

(a) Education. Although training facilities for military training are provided at Fort Chaffee, no general educational programs are available. No actual schools exist for troops or their dependents on the post. Those dependents and military personnel who attend school do so off-post in Fort Smith, Van Buren, Booneville, Greenwood, Charleston, or Paris. The most extensive public school system in the area is that of Fort Smith, which is readily available to on-post personnel and dependents with only a short driving distance. About 20 elementary schools for grades 1-6, 4 junior high schools for grades 7-9, and 3 senior high schools for grades 10-12 are available at Fort Smith. Westark Community College, located in Fort Smith, provides advanced education for area residents including military personnel who wish to acquire advanced formal education. There are also seven private schools in the area. Six are parochial and one is a school of nursing.

(b) Public health, welfare, and safety. The U.S. Army hospital is located adjacent to the south end of the east portion of the cantonment area at Fort Chaffee. It consists of approximately 122 mobilization type temporary buildings. It contains all facilities for the care of medical and surgical cases at Fort Chaffee. The hospital has a mobilization capacity of 1,437 beds, but while it is inactivated it retains equipment for a 250 bed hospital. Only normal reactivation procedures are required to make the entire facility usable. Two civilian hospitals provide several hundred beds each to serve the civilian population. Schools that are operated by these hospitals include a school of nursing, school of medical technology, school of x-ray, and a school for practical nurses.

The public health center at Fort Smith, Arkansas, has reported that the major disease problem that plagues the area in which Fort Chaffee is located is that of venereal disease. Cases reported from 1967 to 1969 include:

	<u>1967</u>	<u>1968</u>	<u>1969</u>
Gonorrhea	5,996	6,140	1,852
Syphilis	1,062	636	342

Sebastian County had about 1.56 medical doctors per 1,000 persons in 1972, and this figure was larger than any in the State except Garland and Pulaski Counties, where the cities of Little Rock and Hot Springs are located. Sebastian County had 10.03 hospital beds per 1,000 population and Crawford County had 3.86 beds per 1,000 population. Of the 75 counties in Arkansas, 40 have fewer than 1 doctor for every 2,000 inhabitants. The number of dentists in Sebastian County for 1972 was .48 per 1,000 persons, and in Crawford County there were .19 dentists per 1,000 population. There were two nursing homes in Crawford County in 1972 and eight in Sebastian County.

Indications are that about 50 percent of the families of Sebastian County have inadequate diets, according to statistics acquired by the Cooperative Extension Service of the University of Arkansas, Division USDA. This applies to families at all social and economic levels. Reasons for this phenomenon include:

Homemakers lack the knowledge of what makes an adequate diet or lack knowledge of the basic four food groups.

Homemakers lack the knowledge of principles of food cookery.

Homemakers lack knowledge of proper utensils, appliances, and equipment needed for satisfactory food preparation.

Homemakers lack the desire or drive to improve their own nutritional intake.

The Cooperative Extension Service is attempting to improve the health and welfare of the people of Sebastian County through educational and personal counseling. This program is available to military personnel and dependents living in the county.

Law enforcement within the boundaries of Fort Chaffee is under the direction of the provost marshal who has a cooperative agreement with the communities surrounding Fort Chaffee for coordinated law enforcement. According to these agencies past problems have stemmed from the lack of regard for the permanent residents and their property by visiting troops, who are transient to the area.

(5) Economy.

(a) Manufacturing. Approximately 180 manufacturing firms, 24 of which are in the food and kindred products category, currently are located in the cities of Fort Smith and Van Buren. A wide variety of manufactured products includes lumber and wood, machinery, apparel, paper, bricks, furniture, and glass.

(b) Agriculture. Farmlands adjoining Fort Chaffee consist of two distinct areas, a very narrow alluvial flood plain area along the Arkansas River and the upper terraces and ridges.

Beef and dairy cattle pasture the terraces and ridges, whereas the lower lands are used mainly for crops of soybeans, corn, and oats. A wide variety of vegetables and fruit crops are also grown in this area. Cotton, once prominent, has decreased in importance, giving way to soybeans.

Poultry, primarily broiler production, constitutes a sizable segment of agricultural activities. The average size farm in Sebastian County covers 388 acres and is valued at \$67,000. A large percentage of area farmers supplement farm income by working in Fort Smith. In many cases, both husband and wife are employed in industry.

(6) Land use. A land use study of the cities of Fort Smith and Barling, which adjoin Fort Chaffee on the west and north respectively, was conducted by Harland Bartholomew and Associates in 1966. Current land utilization is described generally; however, a significant amount of vacant land within the built-up areas has been changing rapidly to developed land. Results of the study indicate that strip commercial (trade) uses on main traffic arteries and numerous areas where there is a mixture of land uses has been striking. These highlights suggest the possibility of numerous nonconforming land uses or the failure to define clearly and maintain zoning districts.

Residential development comprises 53 percent of the total developed area. This is an unusually high ratio in comparison to other land uses. Over 95 percent of residential development is in single family homes. This type of residential development causes the Fort Smith area to be exceptionally large in land area compared to cities similar in population.

The next largest users of land are transportation, communications, and utilities, which use 30 percent of the 3,442 acres of total developed acreage. Of this percentage, street rights-of way use 20 percent and railroad rights-of-way 9 percent, leaving only 1 percent for substations, telephone exchanges, and similar uses. This planning area falls below all other comparable cities in the

percentage of land for street rights-of-way. This is attributed to the high proportion of narrow rights-of-way. The higher percentage of railroad property indicates the relative significance of this mode of transportation in this planning area.

The percentage of land used for manufacturing in the planning area is below the average for the comparable cities, but this percentage should rise slightly as the industrial base increases. Most of the manufacturers are located within the corporate limits of the city of Fort Smith with only a small amount in the remainder of the planning area. Presumably this occurred because of the availability of utilities and as a result of the annexation by the city.

Over 350 acres of parks and recreation facilities are included in the 531 acres for cultural, entertainment, and recreational uses. This represents only 3.2 percent, or next to the lowest percentage, for comparable cities. However, this was partially offset by Fort Chaffee's deeding 799.46 acres (for \$240,000) to Sebastian County for a regional type park (figure 1-12).

The remaining two developed uses are trade and services with 3 percent and 6 percent respectively; however, much of this includes educational facilities.

Undeveloped land accounts for approximately 26,000 acres of a total of 37,000 acres in the planning area. This undeveloped acreage includes farming, mineral extraction, vacant land, and small water areas; but it excludes the Arkansas River.

Much of the vacant land, particularly in the southern portion of Fort Smith was converted to industrial uses between 1968 and 1973.

Since 1966 there has been considerable pressure to encroach upon the lands of Fort Chaffee for community uses. Sample demands include the development of a regional park covering almost 800 acres, and conversion of nearly 400 acres to a dam (figure 1-13) and recreation areas along the McClellan-Kerr Arkansas River Navigation System. Other suggested uses of Fort Chaffee lands have been water supply reservoirs, port facilities on the Arkansas River, solid waste disposal sites, and industrial parks.

Some concern has been voiced by many community leaders that Fort Smith is virtually contained by the Arkansas River on the north and west, the city of Barling on the east, and by Fort Chaffee on the east and south. Only a narrow corridor on the south is open to

continued urban sprawl. Urban planners do not feel that this is necessarily a limiting factor to continued growth of Fort Smith, due to the extent of vacant areas within the existing city limits.

The city of Barling also feels somewhat restricted by Fort Chaffee, but that city, too, has ample opportunity to develop existing land areas more efficiently.



FIGURE 1-12
REGIONAL PARK



FIGURE 1-13
DAM AND DAM 13
1-65

Section 2

Summary of Impact

2.1 General Conclusions.

The overall training mission as described in section 1 has been fully evaluated in respect to its impact upon the natural and human environmental resources within and adjacent to Fort Chaffee, Arkansas. It has been concluded that the current overall training mission does not and will not result in significant adverse impacts on the environment and does not and will not result in a significant adverse public reaction; therefore, an environmental impact statement is not required. Detailed supporting evidence can be found in the files of the directorate of facilities engineering at Fort Chaffee, Arkansas.

a. Air and water contaminants. Due to a lack of significant air pollution sources, the ambient air above Fort Chaffee contains air of excellent quality. The post is in compliance with the pollution abatement requirements of Army regulations. Since the requirements of Army regulations are more restrictive than Arkansas State standards, the post is in compliance with those State standards. The air quality above and around the post probably also meets the National Ambient Air Quality Standards established by EPA. There have been occasional dust problems at Fort Chaffee and dust suppressants have been applied in problem areas. These dust problems are temporary nuisances and do not endanger health and safety. Controlled and unintended fires create insignificant and temporary nuisance situations from time to time. No other air pollution problems exists at the post at this time.

The surface and ground waters of Fort Chaffee appear to be of average quality or better, relative to other waters in the general region of which the post is a part. These waters could be put to any commonly recognized beneficial use; for example, the waters could be used in their existing state for agricultural activities, and with a minimum of conventional chemical treatment, these waters could be easily rendered fit for human consumption. The post's waters appear to meet the standards set forth in the Arkansas Water and Air Pollution Control Act. The waters are in class B category or better, as defined in that act as explained in paragraph b of this report.

The following five potential water pollution sources currently exist at Fort Chaffee: (a) heavy metals from projectile detonations in the impact areas, (b) leachate from the post's sanitary landfill, (c) effluent from the post's bio-oxidation ponds, (d) effluent wash water from the post's swimming pool, and (e) vehicular washrack effluents. At the present time, none of the five identifiable potential pollution sources are contributing significantly to the pollution load of the regional streams and other surface waters. Existing data indicate the heavy metal concentration in the soil samples from the impact areas does not vary a great deal from on-post and off-post control samples. Hence, heavy metals originating from military activities do not seem to impose a significant pollution problem at this time. Data for the sewage disposal facility indicate that BOD and dissolved oxygen levels are good to excellent but that suspended solids are too high, ranging from 50 to 300 mg/l at times, with an average value of about 99 mg/l. It should be noted, however, that upstream from the oxidation ponds the suspended solids concentration averages 95 mg/l, and is about the same value as that of the sewage effluent. The technology for improving the effluent from these bio-oxidation lagoons does exist, and application of this technology is being investigated by the facilities engineer at the present time. The BOD levels in the effluent average about 7.6 mg/l and this does not impose a significant pollution load on the receiving stream. The dissolved oxygen concentration in this facility's effluent averages about 7.2 mg/l during the peak load summer session. This compares well with the average dissolved oxygen level in the stream of 6.9 mg/l. These facts point to the conclusion that the sewage effluent does not reduce the existing oxygen levels in the receiving streams. By the end of calendar year 1975 structures will exist that will carry the effluents from the swimming pool and the vehicle washracks to the sanitary sewers and thus eliminate these two potential stream pollution sources. There is no evidence which supports the idea that sanitary landfill leachate is polluting the area streams.

In summary, no evidence exists to indicate a significant air pollution problem from military activities at Fort Chaffee; however, a pollution problem does exist resulting from the effluent from the sewage treatment facilities into Little Vache Grasse Creek. Steps are being taken to correct the latter condition.

b. Air and water quality standards. The State of Arkansas has established air pollution standards as a part of its statewide pollution control plan; however, these standards are not as restrictive as Army Regulations. Since Fort Chaffee meets the abatement requirements of Army regulations, it also meets the requirements of the less restrictive Arkansas State standards. In all likelihood the post meets the National Ambient Air Quality Standards established by EPA as well.

The State of Arkansas has established a three category classification system for its surface waters based on the type of beneficial use for which each water source is suitable. These categories are designated class AA, class A, and class B, with class AA being the most desirable, class B being the least desirable, and class A of medium desirability. From observations, the surface waters of Fort Chaffee appear to be of class B or better; however, a water quality survey should be conducted to confirm these observations. In addition to the classification system, the State has established specific standards for 13 of the commonly recognized water quality standards (such as turbidity and bacterial counts).

c. Water supply sources. Potable water for Fort Chaffee is purchased from the city of Fort Smith, Arkansas, and is delivered to the post's distribution system. Both the quality and quantity of this water supply source is considered adequate to meet all foreseeable demands of the military establishment. Water from the nearby Arkansas River is not utilized by the post because of its undesirable quality relative to the existing Fort Smith supply. Several low yield wells supply a small part of the Fort Chaffee supply, but these wells are inadequate for general use. Military activities at Fort Chaffee will have no adverse effects on any known or potential water supply source.

d. Noise level standards. Noise is usually defined as unwanted or misplaced sound and is composed of erratic, intermittent, and randomly complex sounds. Noise is rarely composed of a pure tone or a single frequency. In the above definition of noise, the terms used require a subjective judgment and there may not always be agreement as to what is and what is not noise. What is noise to some may be beautiful music to others. Music may be noise if one is trying to sleep and the sounds are disturbing. This means time of exposure and the psycho-physiological state at the time of exposure are important in the classification of sound as noise.

The effects of exposure to noise may be evaluated in terms of their psycho-physiological impacts on humans and animals and the extent to which exposure elicits behavioral and social action changes. Annoyance is one of the most easily recognized impacts on both humans and animals when they are exposed to unwanted sounds.

In general, noise levels at Fort Chaffee meet or are better than the noise level standards adopted by the Department of the Army as described in TB-MED-251, pages 3 and 4. In turn, these standards are more rigorous than those noise standards established by the Federal Government by way of the Occupational Safety and Health Act of 1970. When weapons are fired, however, impulse noise levels exceed those of TB-MED-251 during the period of firing and in some undefined space configuration surrounding the firing points and the impact area. As a result of the firing of some weapons, noise outside the reservation

boundary may exceed those acceptable levels during firing exercises. There have been complaints resulting from noise levels created by the firing of 106mm recoilless rifles on range 83. This situation was investigated and resulted in the conclusion that the complaints were largely unwarranted; however, remedial action was taken to reduce the firing noise in an attempt to mollify the complainant. A berm was constructed behind the firing position, and this structure led to a reduction in apparent noise levels. This reduction was recognized by the complainant, and there have been no further complaints from this individual in over a year and one half. In any case sound pressure level data do not exist which could sustain or disprove the basis of his complaints. A noise survey should be made at Fort Chaffee and noise level contours developed from data generated by the survey.

e. Solid wastes. Solid wastes generated at Fort Chaffee include paper, glass, wood, food, textile, rubber, junk, metals, gunpowder, leather, building materials, hospital wastes, asbestos, cartridge cases, and munitions boxes. Some of these items are recoverable and are recycled. Items that are not recoverable are disposed of in an on-post sanitary landfill operated by a commercial contractor according to standard sanitary landfill procedures. There may be a problem of materials from the landfill leaching into area water sources, but no data exist which would define this potential pollution source. At the present time, this landfill has no known adverse effect on the environment. Recoverable items, including shell casings, ammunition boxes, and petroleum related wastes, are collected and disposed of by the post property disposal officer. This recycling process has a beneficial, rather than adverse, impact on the environment.

f. Public utilities. Existing public utilities used by Fort Chaffee have been detailed in section 1 of this study. Public utilities used by the post include potable water supply, natural gas fuel, and electrical power. The military reservation maintains its own on-post wastewater treatment facility. There are no known negative impacts on these public utilities as a result of any military activity originating at Fort Chaffee.

Potable water for the post is purchased from the city of Fort Smith, Arkansas. As received at the post this water is of excellent quality in all respects. As a public health measure, the water is rechlorinated as it enters the post distribution system. Water is stored in two tanks with a total capacity of 3.5 million gallons and is distributed through systems designed to serve 25,000 troops in each of two housing areas. Flow to firefighting systems is designed to maintain a minimum flow of 1,000 gallons per minute.

Natural gas fuel for Fort Chaffee is purchased from the Ark-Okla Gas Corporation and is delivered to the post by way of company owned lines. Natural gas is obtained from wells located in eastern Oklahoma and western Arkansas. Several coal-fired heating systems on the post have been converted to the cleaner burning natural gas. The existing natural gas distribution system is inadequate and should be updated by the company.

The Oklahoma Gas and Electric Company supplies electrical power to Fort Chaffee and both the power source and the distribution system appear to be adequate at this time. The use of this power facility to meet the demands at the base has not created adverse effects on the power company or its other customers.

The wastewater treatment facility at Fort Chaffee consists of a collection system, a lift station, and two bio-oxidation ponds. The oxidation ponds were designed for an intermittent peak of 75,000 personnel. The pond design included provisions for a hydraulic loading of 100 gallons per capita per day and an organic loading of 40 pounds of 5-day BOD per acre of pond surface area. The wastewater effluent is discharged into the Arkansas River by way of Little Vache Grasse Creek. Chemical analysis of the effluent during the summer of 1973 indicates that both BOD and dissolved oxygen levels in the effluent were satisfactory, but that the suspended solids levels were high, ranging from 53 mg/l to 305 mg/l. These high suspended solids levels are not atypical of bio-oxidation pond effluent.

g. Aesthetics. In evaluating adverse impacts upon the aesthetic qualities of Fort Chaffee, analysis centered on major activities of the reservation, utilization of the area for training purposes, and maintenance and management of the area in support of the training mission. Specific construction programs are not included in this analysis per se, only as a contributor toward a potential accumulative impact.

Training activities disrupt the natural aesthetic qualities of the area on a temporal basis lasting from just a few seconds to perhaps several years. Noise and dust generated from track vehicles is a disruptive feature lasting only a short time in a given area. Disruptive noise from an aesthetic point of view from small arms or artillery fire may last several hours; however, the periodic fires caused from firing degrade the area for days, weeks, or until the new growing season. Deep ruts in the ground and damaged trees caused by off-road use of track vehicles detracts from the naturalness and beauty of the prairie and woods for a longer time depending on the season, terrain, and extensiveness of the deterioration. Nature can heal, and has healed, much of the damage to the aesthetic environment of Fort Chaffee. One area that

will suffer a lasting impact is the area where quarrying activities have stripped the ground of its vegetative cover. This practice by combat engineer units is a necessary activity and will continue. Efforts to minimize the destructive appearance of the quarry could be initiated in the form of landscaping along the entrance to the quarry, and checking local erosion patterns caused by quarrying activities.

Maintenance and management practices contribute to both beneficial and adverse effects upon the aesthetic attractiveness of the natural setting. Landscaping, weed control, mowing, and tree planting in and around the cantonment, along roadsides, in cemeteries, and on the golf course enhances the post facilities. However, maintenance of the perimeter firebreak is considered by most people as an ugly eyesore upon the landscape, irrespective of its functional necessity to prevent fire from spilling over onto private land. Relocation and incorporation of landscape design measures can minimize the practice, particularly along public highways.

Fort Chaffee has an active fish and wildlife management program which contributes immensely to its wildness character, one of its most outstanding aesthetic attributes. Burning of large areas yearly for wildlife purposes causes concern from some local people; however, an informative educational program explaining the value of prescribed burning should minimize this concern.

h. Ecological balance. Fort Chaffee is physiographically situated in the Arkansas Valley section of the Ouachita Mountains province of the Southern Interior Highlands. The soils range from silty through sandy silt to stony. The average annual rainfall is about 42.22 inches with wet spring seasons and dryer summers. Average temperatures range from a low of about 40 degrees to a high of about 83 degrees. Land types range from Arkansas River bottom land to rocky Ozark hills. Biotically, Fort Chaffee lies in the Ozark biotic district of the Carolinian biotic province. This biotic area is generally characterized by the presence of four major vegetative types, i.e., post oak-blackjack oak type, oak-hickory type, bottom land-hardwood type and prairie type. There are direct relationships among soil types, precipitation and temperatures, and the vegetation to be found. There is also a direct relationship between the vegetation and the animals' need for food and cover in their selection of a habitat.

Not only is there a positive or direct interrelationship between animals and plants, but also among animals. Because of the two types of relationships, the animals found in the area fall into two standard categories - primary consumers (grazers or herbivores) and secondary consumers (carnivores and omnivores).

The more noted herbivores in the area include the red squirrel, beaver, cottontail rabbit, and whitetail deer. The red squirrel lives in open woodlands of either hardwood or conifer varieties, preferably upon and along ridges where it feeds on acorns, various nuts, and occasionally Osage oranges, blossoms, fruits, and berries. The aquatically oriented beaver inhabits the streams of the area and consumes plant materials exclusively, consisting largely of the bark of softwoods felled near the bank. Such trees are sycamore, cottonwood, birch, and willow found in the Arkansas River Valley and tributaries. Dams built by beavers provide water holes for other terrestrial species and many aquatic species. The cottontail rabbit feeds on herbs, tree bark, and vegetables, thus being a crop and tree destroyer. The deer, which prefers to inhabit brushy areas, feeds primarily on browse consisting of twigs and leaves; rarely eats grass, but eats some acorns and nuts. A study of the food preference of Arkansas deer by Dale indicated that deer feed principally on deerberry (Vaccinium stamineum), dryland blueberry (V. vacillans), dogwood (Cornus florida), greenbriar (Smilax spp.), and sassafras (Sassafras albidum). Nonpreferred food sources, but utilized during fall and winter seasons, include acorns and nuts of several oaks (Quercus alba, Q. velutina, and Q. stellata), black hickory (Carya texana), and shortleaf pine (Pinus echinata). Grasses, ferns, and forbs also play a role in the diet of deer. Most, if not all, of these species are found on Fort Chaffee (Dale). The most common secondary consumers to be noted in the area include: armadillo, opossum, raccoon, skunk, mink, muskrat, red and gray foxes, bobcat, and coyote and mixed canids. The armor-plated armadillo seeks out its diet of insects and vegetation along rocks where it can readily hide in caves during the day time. The shy opossum is common in wooded areas where its night time forays include foraging for eggs, persimmons, mice, insects, carrion, and an almost limitless list of other organic food items. The raccoon searches for food and shelter in essentially the same areas as the opossum but with a little greater preference for areas near water. Its diet consists of poultry, insects, fruits, vegetables, rodents, and aquatic animals. The skunk, found in woods or plains with loose soil, has a diet very similar to the raccoon's except for the aquatic animals. The mink can usually, be found in wooded areas near a waterway but sometimes can be found some distance from water. Its diet consists of rodents, fish, and poultry, as well as marsh-dwelling birds and young snapping turtles which can be destructive of young waterfowl. Another aquatically oriented denizen is the muskrat, found in waterways and marshes, which consumes plant materials, shellfish, and other small aquatic animals. The red and gray foxes and the bobcat can be found in wooded and brushy areas. None of them seem to be bothered by the nearness of humans. Their food preferences are rodents, game animals, birds, carrion, and some vegetable matter. They may be considered friends of orchardists and grain and livestock farmers, except those raising poultry. Coyotes, wolves, feral dogs, and hybrids are

inhabitants mostly of the open country. A detailed study of the canis, predominantly coyotes, was conducted on Fort Chaffee in the early 1970's by Gipson. Gipson evaluated the movement and eating habits of wild canis through radio tracking of 13 coyotes and one wild dog which were trapped and released, and through stomach analysis of animals killed or trapped by the Arkansas State Fish and Game Commission. Results of the study indicate that the average home range for adult male coyotes is 12.8 square miles, with females averaging somewhat less at 5.1 square miles, and that there is an overlapping of the range between animals. Male coyotes moved about 2 miles daily and females 1.6 miles. It was found that movement activity could be at any time, but was made mostly at night. Characteristics of the red wolf and wild dog were also observed among the coyote population at Fort Chaffee. Stomach analysis revealed the five most prominent foods found, in order, were poultry, persimmon, rodents, songbirds, and insects. By season, predominant foods were huckleberry in the spring; songbirds, rodents, insects, and mulberry during the summer; persimmon, watermelon, deer carrion, and commercial feed along with songbirds in the fall; and songbirds, commercial feed, and persimmon in the winter. Rabbits and poultry were found throughout the year.

The reptiles and amphibians find their place in the balance of nature by being notorious consumers of rodents, insects, and other small arthropods. They can be found in habitats ranging from arid, rocky hills to moist bottom lands.

The fish inhabiting the area can be found in streams, beaver ponds, stock tanks, and small lakes. The fish found in streams and beaver ponds are there by the will of nature. The fish inhabiting stock tanks and small lakes are there because of the will of man in his efforts to promote the populations of sport fishes such as the basses, sunfishes, catfishes, and crappies. The basses feed on plankton and insects during the fry stage and change to a varied diet of larger animals when they become adults. The young sunfishes feed on small insects and the adults feed on larger aquatic species. Catfish fry feed on insect larvae, the older fish consume small fish and crayfish, and the adults feed on a wide range of living and nonliving organic matter. Crappies feed on insects and small arthropods throughout their entire life.

The bird species that frequent an area are directly related to the type of vegetation present. Because the area contains four vegetation types, the variety of birds that can be found on Fort Chaffee is quite large. The 1962 Audubon Christmas count revealed over 4,000 birds representing some 81 species.

Because the Fort Chaffee reservation has a full time staff that is in charge of "grounds maintenance," the "wild" flora and fauna can be developed, managed, and utilized to an optimum degree consistent with climatic conditions. The vertebrate resources, whether they be terrestrial or aquatic, and commercially or aesthetically valuable, are cared for either through the activities of the post maintenance crew or through the resident Arkansas State Fish and Game Commission crew. Their abundance is encouraged through manipulation of vegetative succession (i.e., selective burning), cultivation of food plots and maintenance of optimum fish pond fertility. Destruction of vegetation during training activities is usually mitigated by sowing seeds of annual and perennial grasses which revegetate bare areas in a short time. Recent efforts have focused on reducing the number of cattle now permitted to graze on reservation lands. A conflict arose when cattle, after decimating the grasses, began to forage on browse needed for deer. Distribution of fish and wildlife throughout the reservation is encouraged by constructing livestock water impoundments at desirable sites throughout the reservation, and spacing out food plots over the entire area. Vulnerability of these organisms to human disturbance is minimized because each training activity is restricted primarily to specific areas developed for them and because additional space is available for the wildlife to seclude themselves away from the disturbing activity. Additionally, field representatives of the Arkansas Game and Fish Commission patrol (both during training exercises and during the off-season) to prevent violations of Federal and State fish and wildlife regulations. An attempt is made, within the state of the art, to manipulate only those elements in the food chains, predator-prey relationships, and energy balances that permit a steady state of fish and wildlife production at the optimum level so that a maximum of public needs can be met. This permits nature to do the remaining work. The procedures described previously are believed to provide for more and healthier organisms than could be expected if the lands involved were still under private ownership.

i. Soils. The soils of Chaffee have decreased in productivity through the years due to timber clearing, intensive row cropping year after year, and poor farm practices of tenant farmers. The healing processes of nature have begun to increase the soil productivity generally as each year's new layer of humus is added. Former cropland is scarcely visible now. Sheet erosion is known to occur in the impact areas due to the periodic fires that burn over the area yearly and from overgrazing by cattle. Erosion also originates at several locations along the perimeter firebreak, especially where the firebreak is constructed perpendicular to the ridges. During wet periods, both track and wheeled vehicles of training units contribute to some soil erosion.

Although the periodic fires are controlled as soon as possible, fires will continue to occur. Cattle overgrazing by lessees has been curtailed by canceling leases. Once the area has recovered, it is expected that cattle grazing will again be initiated but with a greater amount of control exercised. Erosion from firebreaks can be minimized by relocating the lines, eliminating them in some areas, construction of small check dams, and construction of water bars.

Analyses of potential soil contamination by heavy metals found in military ammunition indicate no significant difference in concentration between soil samples collected within the impact area and those collected outside the impact area.

Disruption of soil resources from construction activities are described specifically in environmental assessments or statements concerning that specific action. It is noted, however, that construction activities do contribute to the overall soil erosion and deterioration that occurs on Fort Chaffee lands.

j. Institutions, sites, and resources. A survey of facilities and interviews with local officials indicate few problems exist in these areas between residents and Fort Chaffee personnel. City and county schools are not greatly affected owing to the limited number of permanent troops and civilians employed at Fort Chaffee; however, Fort Smith schools are experiencing a growth problem. A mission change at Fort Chaffee could affect them.

The presence of transient troops during two-week intervals of annual summer training at Fort Chaffee does not appear to impair the health and welfare of local residents. Local hospital and public health officials report no increase in hospital cases or communicable diseases as a result of troop interaction. For example, since 1962 about 7,000 cases of gonorrhea and syphilis have been treated annually. Venereal disease rates among local residents have not been affected by transient troops. Although moral aspects may be questioned by local residents, venereal disease control is helped by the presence of professional prostitutes.

Welfare rolls are not abnormally high, representing only about 2 percent of the population.

A program of cooperation among law enforcement agencies was revealed in interviews with the Arkansas State Highway Patrol at Little Rock, Fort Smith's city police chief, and the Barling police department. Joint patrols and cooperative programs between law enforcement officers of Fort Smith and Barling and the Fort Chaffee military police units help mitigate potential problem areas in activities generated by fort personnel, e.g., authorized troop movements or personnel disorders.

Since there are no recorded historical sites or known archeological sites at Fort Chaffee, no adverse effects of the training mission upon them is evident. Location of training activities, generally outside of the Arkansas River Valley and the interior drainages lead to the conclusion that training activities have little effect on unknown archeological resources. An extensive survey of the reservation to locate sites would be necessary before their significance and the effect of training on them could be evaluated.

It is known that construction activities such as dam and lake, roads, and training facilities could destroy unknown archeological resources. An archeological survey of the construction site would evaluate the impact and recommend salvage procedures if needed. The Arkansas Archeological Survey has indicated that it would undertake a study of the reservation for approximately \$16,600.

Although no historical resources are recorded, the Fort Chaffee area does have a rich history and efforts could be made to provide interpretation of these resources. Cemeteries existing from pre-Fort Chaffee days constitute a cultural resource that is protected and cared for by Fort Chaffee personnel and local citizens.

k. Socioeconomic balances. The existence of Fort Chaffee has had a tremendous impact upon the region's economy and population. Employment patterns reveal that a direct correlation exists between the type of employment and the activation-deactivation of Fort Chaffee. With deactivation the community had to learn not to depend on Fort Chaffee as its main industry, subsequently, in recent years manufacturing in the Fort Smith area has experienced a rapid diversification and has enjoyed considerable growth. Approximately 3 to 4 percent of the work force is affected every time there is a major mission change at Fort Chaffee.

Direct correlations between other indicators of the region's economy and activation-deactivation of Fort Chaffee also exist. When Fort Chaffee was deactivated, significant decreases were noted in building permits, airline passengers, and bank deposits. Conversely, significant increases were noted when Fort Chaffee was activated.

School enrollments, public transportation, and other public services extended by local government have been notably affected.

Under the current semi-active status of Fort Chaffee, the people and the region have been able to adjust to the seasonal influx of National Guardsmen and reservists. As long as Fort Chaffee stays in semi-active status, local officials indicate few problems will exist between the local community and Fort Chaffee. A mission change, however, could seriously affect the socioeconomic balance

of the community as it has in the past. Most local community leaders favor maintaining the status quo. Not only does the community directly benefit from post and personnel expenditures in the entertainment and service industries, but the local population has access to much of the area for outstanding fishing, hunting, and other recreational opportunities.

Despite the trend of diversification into manufacturing by the city of Fort Smith, Fort Chaffee still remains as a major industry in the region. Of the \$12 to \$13 million a year operating budget, approximately \$5.5 million goes into the local economy as payroll to permanent military personnel and civilian employees, including retired military personnel living in the area. Another million is expended on local utilities and supplies. An unknown amount of the \$4 to \$5 million military payroll of National Guardsmen and reservists is spent in the local economy but it is known to be substantial. The Post Exchange is considered separate and above the post's operating budget. Total sales of the Post Exchange amount to over \$2 million annually. Approximately 15 percent of the total purchasing power for Exchange activities is done locally. These purchases are input into the economy as is the Exchange payroll which amounts to over \$200,000 per year.

1. Recreational areas. Fort Chaffee is fortunate in that it not only has its own outstanding fishing, hunting, and other outdoor recreation opportunities within its borders, but it is located between two national forests, adjoins an extended waterway (Arkansas River) system, and lies close to many Federal and State lakes with developed recreation areas. The outdoor recreational opportunities within Fort Chaffee are available to the general public as well as the troops who train there. Adjoining communities provide additional recreation services to visiting personnel that are not available at Fort Chaffee. In turn, Fort Chaffee has made available to the local communities needed open spaces that otherwise would not be developed, such as the regional park and areas near lock and dam 13.

Within Fort Chaffee, recreational facilities and services are provided for visiting troops as feasible during the intensive summer months training period. During the summer months, retired military personnel and their dependents are also able to take advantage of the recreational facilities and services.

m. Multiple use of space. The area occupied by Fort Chaffee is utilized for military training, agricultural production, fish and wildlife conservation, recreation and waste disposal. From all indications, the method in which the lands at Fort Chaffee have been used has resulted in general improvement. One exception was an area that was leased for grazing. Because of noncompliance with

the terms of the grazing lease, the lease was canceled and the area allowed to recover from overgrazing. Otherwise, through existing uses and with a continuation of current land resource management programs, the multiple use of space on Fort Chaffee will permit the continual improvement of the post's natural environment.

Section 3

Adverse Environmental Effects Which Cannot be Avoided

3.1 General.

Any activity by man in the biosphere will cause a change within the environment. Just as there are different ways to conduct an activity, there are also different magnitudes of change caused by man's activities. There may be adverse impacts which cannot be avoided no matter which alternative of accomplishing the desired activity is selected. This section is devoted to discussing those adverse impacts on the environment which will be caused by the selected method of satisfying the purposes of the activity.

3.2 Impact on air quality.

a. Fuel consumption. Air pollution emissions at Fort Chaffee due to the consumption of fuel by all sources constitute an insignificant pollution burden on the air space above and around the post. Air pollutants generated on the post are small in total quantity and are very rapidly dissipated, so that pollutant concentrations are far below the upper limits allowed by the National Ambient Air Quality Standards established by the Environmental Protection Agency. Also, the post is in compliance with Department of the Army air quality regulations which are more stringent than State standards.

b. Dust and smoke. Although both of these air pollution problems have surfaced from time to time at Fort Chaffee, the problems have been minor and generally insignificant in their impact on the area's environment. Both sources of air pollution have been temporary in nature and of a slight nuisance to some individuals. Dust suppressants have been applied in problem areas and unintentional range and forest fires have been quickly brought under control by post fire fighting facilities. Controlled burning of range land has been practiced when such activity would result in increased range land productivity; however, the resulting smoke generated was of little overall significance due to the close controls imposed on the burning activity. These activities have had no permanent adverse effect on the region's environment.

c. Summary. Due to a lack of significant air pollution sources at Fort Chaffee, the air quality above and around the post is of excellent quality. No evidence exists that would support the idea that any military activity at this installation serves to significantly pollute the atmosphere.

3.3 Impacts on water quality.

a. Sewage waste. Wastewaters produced at Fort Chaffee are treated in two on-post bio-oxidation ponds. During most of the year the load imposed on these lagoons is low and an adequate degree of treatment is achieved. During the summer months when the troop population is heavy, the load on these lagoons is increased resulting in the degradation of the effluent with respect to suspended solid concentrations. During the summer months the suspended solids concentrations may rise to an average value of 99 mg/l as compared with the suspended solids concentrations of 95 mg/l prevailing in the stream receiving this treated effluent. In other words, even when loaded to the maximum extent this facility produces effluent with a suspended solids level that compares well with the suspended solids level in the receiving stream. This does not justify this level of suspended solids in the effluent, but it may indicate that due to overall small volumes of effluent, the facility does not seriously degrade the existing quality of the receiving stream. The technology for improving the effluent from these bio-oxidation lagoons does exist, and application of this technology is being investigated by the facilities engineer at the present time.

The BOD levels in the effluent average about 7.6 mg/l, as compared with the level in the receiving stream of 7.0 mg/l, an insignificant difference particularly in view of the small volume of effluent relative to the discharge of the creek. This BOD level does not impose a significant pollution load on the receiving stream.

The dissolved oxygen concentration in this facility's effluent averages about 7.2 mg/l during the peak load summer session. This compares well with the average dissolved oxygen level in the stream of 6.9 mg/l. These facts point to the conclusion that the sewage effluent does not reduce the existing oxygen levels in the receiving streams.

b. Heating and cooling liquids. No significant quantities of heating and cooling liquids are generated on-post, and hence, no pollution burden from these sources is imposed on the area's streams.

c. Vehicular washracks. These pollutant sources are currently imposing a slight and occasional pollution load on area streams and the pollution levels are insignificant. However, by the end of calendar year 1975 this pollution source will be completely eliminated because structures will be completed which will input all effluents from vehicular washracks into the post's sanitary sewer system.

d. Swimming pool effluents. This potential pollution source may impose a slight and occasional load on the post's streams; however, this is considered to be an insignificant pollution load. By the end of

calendar year 1975, structures will be completed which will input these effluents into the post's sanitary sewer system, eliminating this potential pollution source.

e. Summary. There are several sources of water pollution on the Fort Chaffee military reservation. The most significant pollution source is the effluent from the sewage treatment bio-oxidation lagoons. Minor sources of pollution are being corrected. Means for eliminating or abating the pollution from the sewage treatment lagoons are currently in the planning and design phase.

3.4 Impact on solid waste disposal.

Solid wastes generated at Fort Chaffee are disposed of in an on-post sanitary landfill operated under a contract agreement. This facility is operated subject to Department of the Army rules and regulations, and established sanitary landfill guidelines. As with any operation of this type, there exists the potential problem of polluting area surface and ground waters with leachate from this landfill. There is no evidence, however, to support the idea that the operation is currently polluting the area's waters. This landfill is well operated and has no adverse effect on the environment at the present time.

3.5 Impacts on noise.

The noise levels at Fort Chaffee are generally low and the noise sources present, at worst, create a temporary noisy situation. There have been complaints resulting from noise levels created by the firing of 106mm recoilless rifles on range 83. This situation was investigated and it was concluded that the complaints were largely unwarranted. However, remedial action was taken to reduce the firing noise in order to mollify the position of the complainant. A berm was constructed behind the firing position and this structure led to a reduction in apparent noise levels. This reduction in noise level was recognized by the complainant and there have no further complaints from this individual in over a year and one half.

3.6 Impacts on ecological succession.

The policy of controlled burning during a 3-year cycle for wildlife habitat manipulation keeps the ecological succession in a continual state of disclimax. This disturbance keeps the ecological community from achieving its normal state of climax. Burning makes an ideal seed bed for annual grasses and broadleaf weeds, which

will improve the wildlife habitat; however, to produce annual grasses and broadleaf weeds is not a desirable land use management practice. The annuals are increased and the perennials are decreased, which results in excessive erosion. Although burning, with its incidental destruction of some wildlife, could be discontinued, it is considered a safe and productive method of habitat management based on the following facts: (1) The greatest chance of fires on the base occurs during the driest part of the year (summer military training period). (2) If an excessive amount of tinder is not allowed to accumulate, resulting accidental range fires will not generate enough heat to destroy the larger, woody vegetation, nor will it spread so rapidly that most organisms will not have a chance to escape death by fire. Therefore, the loss of some organisms - both plant and animal - is unavoidable, but it is being reduced through vegetation management.

Some adverse impacts will occur when heavy vehicles are required to leave existing roadways and trails during training periods devoted to realistic maneuvers. Plants will be knocked down and crushed and established root systems will be disturbed.

An increase in stream turbidity will be unavoidable where heavy vehicles are required to cross without benefit of adequate bridges.

Although these adverse effects will have a definite impact on ecological succession, they are not expected to reverse the trend but merely to make it more static.

3.7 Impacts on fish and wildlife.

Those adverse effects discussed in section f, Ecological succession, apply also to this section because fish and wildlife are inseparable from ecological succession.

The noise generated at Fort Chaffee is an element that cannot be beneficial to fish and wildlife; however, it has not been proven to be detrimental. Any effect that is caused by noise from small arms, artillery, aircraft, or other vehicles must be classified as unavoidable.

3.8 Impacts on archeological resources.

Because no surveys have been made to locate and evaluate archeological sites on the military reservation, steps cannot be taken to protect sites from inadvertent disturbance. However, since each range has been used in a similar manner for over 30 years, any sites disturbed would have been continually disturbed, and any sites not yet disturbed most likely will not be disturbed in the future.

This assumption is based on the fact that equipment which can cause the greatest amount of inadvertent damage is generally confined to traveling on developed trail and road networks. Resources or elements of historical significance have either been fenced (i.e., cemeteries) or dismantled and removed (i.e., buildings and other structures).

3.9 Impacts on public health, welfare, and safety.

No adverse effects which cannot be avoided in the areas of education, public health, welfare, or safety of local residents are expected to occur with the present mission at Fort Chaffee. Area schools are only slightly affected by the attendance of permanent cadre members and their dependents because of the small number involved as a percentage of all the enrollment in the area schools. This effect would be significant if the number of military related enrollments increased.

No apparent increase in hospital cases or in cases of communicable diseases has been attributed to the presence of transient summer troops at Fort Chaffee. The existence of permanent cadre personnel and their dependents has had no recognizable effect on public health and welfare.

The cooperative agreement between civilian and military police units helps to support the safety and welfare of local residents. Since most activities of transient personnel are limited to the post, their effect on the safety of local residents is minimal.

The overall effects of the present mission at Fort Chaffee are minimal on the education, public health, welfare, and safety of the communities surrounding the post. Therefore, no adverse effects which cannot be avoided are evident with respect to these subjects.

3.10 Impacts on local economy.

Since Federal capital is a part of the economic base of the region, the existence of Fort Chaffee has a significant impact on the local economy. The permanent cadre's economic influence is beneficial to local economies, and the spillover effect of increased capital due to summer training probably causes both positive and negative impacts.

The transient, military population does not expend a large portion of the allotted funds in local economic systems because of their limited contact with businesses off the post. However, they would have some economic effect on the few weekends when they have leave off-post. This variable economic input could have a disruptive

effect on local economies with troops buying up goods which local residents might need, but it is likely that local businesses recognize this effect and prepare ahead of the summer sessions to meet the demands of summer trainees.

Section 4

Alternatives to the Current Utilization of Fort Chaffee

4.1 Conduct training at other installations.

Training is being conducted at other installations. However, for training to be realistic and useful it must be conducted in areas having different topography, climate, and vegetation in order to provide tactically diversified military situations for training troops. The vegetation and topography of the Ozark region, and more specifically Fort Chaffee, make it an ideal area for training. Another factor is that the other installations generally have a resident unit which requires most of the existing facilities and resources. With today's problems of energy shortages and austere budgets, many reserve and national guard units need an installation close to their home. Fort Chaffee's location makes it convenient to units in portions of at least five states. This convenience makes weekend training nearly as feasible as the two-week summer camp.

4.2 Activate post on a permanent basis.

Fort Chaffee has been activated and deactivated on several occasions. To bring the installation's facilities up to standards for a permanent type post would require expenditures of several million dollars. These improvements would require several years to complete. Activation on a permanent basis would require that additional facilities (i.e., housing) be constructed in communities surrounding the post. Because the post has been activated and deactivated a number of times and the economy was "boom and bust," the residents and other investors might be reluctant to undertake such development. Under current conditions, Fort Chaffee and the surrounding communities have adequate facilities to accommodate both weekend and summer units since they have staggered training periods.

4.3 Relinquish control to local governmental authorities.

Control of post lands and facilities by local governments might permit slow deterioration of existing structural facilities. Few governmental agencies outside of the Federal Government have sufficient funds to devote to the upkeep of such a large number of facilities and massive amounts of land area. On the other hand, the post would provide additional area for industrial sites and for residential areas. However, this area of Arkansas is not cramped for suitable areas of adequate size for industrial and residential sites. This being the case, local governmental control of Fort

Chaffee would probably cause a needless heavy tax burden on local and regional residents. For the reasons cited above, plus the fact that Fort Chaffee is needed to adequately train a ready reserve of military troops in the event of a National emergency, relinquishing control of the post to local governmental authorities is considered an undesirable alternative.

4.4 Return to former landowners.

Because many landowners feel that the right of eminent domain is somewhat of an abridgement of their right to own land, they believe that should the land no longer be needed by the Government, they should be permitted to regain ownership of their previous land holdings. This attitude sometimes continues even into second and third generations of heirs. Although this would be the most correct way of returning Government land to private ownership, Federal law requires that surplus lands be disposed of through competitive bidding without preference going to previous owners of their heirs. The foregoing discussion ignores the fact that the post is necessary to maintain a strong National defense posture which helps insure peace for the world. Therefore, the alternative must be rejected for the good of the Nation and for the world.

4.5 No action.

A strong National defense force will help insure peace for the Nation, as well as for the entire free world. This defense structure is composed of not only the full-time professional soldier, but also the well trained ready reservist and national guardsman. It is obvious that the Nation cannot keep a wartime level, full-time professional military structure during times of peace because of the excessive costs involved and because much of the required manpower is needed in the various sectors of the peacetime economy. Hence, historically and currently, the answer to the Nation's defense needs are the ready reservist and the national guardsman. As an offshoot of the defense requirement, these part-time soldiers can be pressed into service during times of manmade as well as natural disasters. Because of its near ideal location, Fort Chaffee is currently serving the training needs of ready reservists and guardsmen in portions of at least five states. Part-time soldiers make extensive use of this training facility during the summer months and on weekends throughout the year. This action proposes the continuation of serving the training needs of reservists at this military installation. This proposal is the best alternative available for meeting the training requirements of reserve military units geographically located near Fort Chaffee. Other alternatives considered were either too costly or did not satisfy the requirements of the National defense structure for realistic tactical training.

Section 5

Relationship Between Local Short-Term Use of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

5.1 Natural environment trusteeship.

In the past, planners have made thorough studies of short-term beneficial and adverse effects of proposed projects only to discover years later that the project or activity had caused many long-term impacts that were not expected or considered. Enlightened people of today have seen environmental abuse and are trying to understand its causes and correctives. Thus, we have entered the realm of environmental trusteeship so that succeeding generations will not inherit a bankrupt and devastated biosphere. This serious acceptance of environmental trusteeship has caused man to reanalyze his approaches to planning and resource uses so that optional uses are not closed for the future.

5.2 Human environment trusteeship.

So that man might achieve and maintain socioeconomic-environmental stability, it is mandatory that all outside forces which would undermine or overthrow the existing social, political, and economic patterns be deterred. Such a deterrent is a strong defensive force, i.e., the military. Through deterrent efforts, the needless and massive waste of human and natural resources resulting from wars is avoided. Conservation through deterrent activities permits the national population to enjoy more of the amenities of life.

With the recent shift to an all-volunteer military force which utilizes a smaller permanent force and an increased reserve force, it has become necessary to maintain military bases or reservations that are operated and maintained for the primary purpose of regular periodic training of reserve forces. Through maintenance of Fort Chaffee for its primary purpose, the following benefits will accrue:

(1) Some of the injury to the flora and fauna on military reservations serving permanent forces will be reduced.

(2) There will be a broader based, better trained military force which will be an effective deterrent to social, cultural, economic, and political upheaval that could be caused by internal and external forces.

(3) The productivity of the land in the reservation will be permitted to increase to former levels.

(4) A wider dispersal of governmental expenditures or funds will result in this area of the U.S. receiving an economic boost and will help offset some of the loss in county land tax revenue.

In addition to the previously discussed benefits, the land is being held in trusteeship until such future time as it will be needed for more important uses. Thus, without closing any future optional uses, the short-term use of the environmental resources of Fort Chaffee will indeed maintain and enhance the long-term productivity of the area.

Section 6

Inventory of Irreversible and Irretrievable Commitments of Natural Resources

6.1 General.

Fort Chaffee has been utilized as a military base for nearly 35 years. Its acquisition forced the relocating of several families, who, for the most part, were farming lands that were generally of marginal productivity. The trauma of relocation, if it existed, is irreversible. Some of this trauma has been passed on to succeeding generations who were never directly affected. This, too, is irreversible.

The construction, operation, and maintenance of trails, roads, and facilities involve the utilization of manpower, funds, resources, and energy which can never be recovered. A similar expenditure of resources occurs during each of the training exercises conducted on the reservation.

Inadvertent destruction of sites of historical and archeological importance will be irreversible. However, greater protection of such sites is afforded by Government requirements than would have been if the area were left in private ownership.

Tax losses to the two county governments due to removal of the reservation lands from the tax rolls will be irretrievable for the duration of time that Fort Chaffee remains under Federal Government ownership. The tax revenues will again become available if the United States ever relinquishes ownership.

Loss of income from agricultural production will be for the duration of the tenantry by the Government. However, some agricultural income has accrued to those few individuals who have held grazing and agricultural leases on reservation lands.

In summary, military ownership and occupation of Fort Chaffee have placed the land and its related resources in a trusteeship that has, in most cases, upgraded or restored environmental integrity. Only the investment of manpower, funds, energy, and materials in both the construction, operation, and maintenance of facilities and training activities can truly be considered to be irretrievable. Few activities have caused irreversible impacts to the natural resources on the reservation.

Section 7

Details of Any Unresolved or Probable Controversy

7.1 Noise.

The impulse noise created by 106 mm recoilless rifles when they are fired on range 83 at Fort Chaffee has been the cause of some controversy. The controversy arose when the complainant, who resides in the same valley but just off post to the west of range 83, circulated among his neighbors a petition calling for the cessation of the firing. Additional action taken by the complainant included letters to then President Nixon, to his local representative, Congressman John P. Hammerschmidt, and Senators J. W. Fulbright and John McClellan.

7.2 Grazing.

The land management unit at Fort Chaffee has recommended and successfully canceled a grazing lease. The lease was canceled when it was observed that the allowable animal units had been exceeded, and the range was severely overgrazed. It will be a matter of several months or years before the foliage recovers to a productive level. During this recovery period, there may be pressure exerted to open this range before it has had time to recover.

7.3 Public water supply impoundments.

As communities adjacent to Fort Chaffee continue to grow and the demand for municipal and industrial water increases, there will be pressure (very possibly political) to permit the construction of water supply impoundments on watersheds within the boundary of the military reservation. One such attempt has already been made, but it was apparently defeated. Future attempts can be expected because all privately owned land will be designated for developments that will return the most money to the owners and thereby produce more revenues for local and regional governments through taxation. By locating impoundments on public lands, privately owned lands can be more highly exploited for economic gains.

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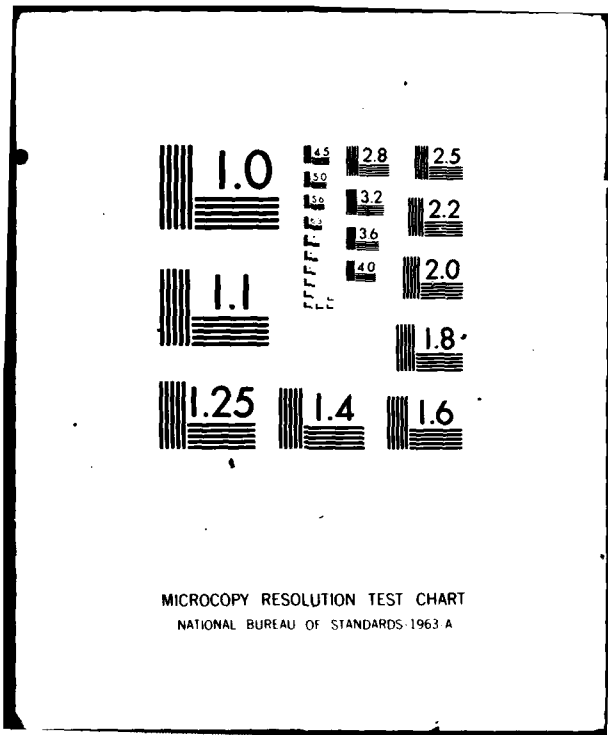
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